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ABSTRACT

This conference report presents the discussions and recommendations of the 290 participants representing 76 nations who met at the first SPIN conference to exchange experiences in strategies and policies for the dissemination of information via networks based on the linking of computers with telecommunications, and to identify ways and means of using this technology to facilitate social, economic and cultural improvement in developing countries. The general report, which includes statements made during debates, focuses on the present state and future prospects for the use of informatics, especially the elaboration of national strategies and policies, and regional and international cooperation and dissemination. Reports from two commissions are concerned with manpower development and the applications of informatics. Of the 44 recommendations adopted by the conference, 22 are devoted to prerequisites for the use of informatics and a final 12 are concerned with regional and international cooperation. Information on the organization, scope, and objectives of the conference, including the preparation and operational details, is provided in the introduction, and annexes contain the conference agenda, opening and closing addresses, a list of documents used by the conference, and a national listing of participants. (RAA)

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Intergovernmental Conference on Strategies and policies for Informatics

Final Report

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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)"

SC/MD/63
Paris, 30 March 1979

SUMMARY

The first Intergovernmental Conference on Strategies and Policies for Informatics (SPIN), convened by the Director-General of Unesco on behalf of both Unesco and IBI, was held in Torremolinos, Málaga, Spain, from 28 August to 6 September 1978. The Conference was organized jointly by Unesco and IBI in accordance with resolution 2.131 adopted by the General Conference of Unesco at its nineteenth session, resolution No. 7 adopted by the General Assembly of IBI at its eighth session, and was held at the kind invitation of the Government of Spain.

Delegates from 76 Member States of Unesco, of which 25 were also members of IBI, took part in the Conference, as well as representatives and observers from one non-Member State, seven organizations and bodies of the United Nations system, five other intergovernmental organizations, and four international non-governmental organizations, all invited in conformity with the provisions of document 102 EX/11. Altogether 267 delegates and 23 representatives and observers took part in the Conference.

The objectives of the Conference were to exchange experiences in strategies and policies in informatics, especially those aimed at ensuring the development of endogenous capacities and the optimal utilization of resources; to identify ways and means whereby informatics could contribute to economic, social and cultural development, bearing in mind the particular needs of developing countries; to clarify the prerequisites for the elaboration of strategies and policies at the national level; and to draw up a programme of action for international co-operation and assistance in the field of informatics.

The above themes were discussed by the Conference in plenary and in the two Commissions which were established. The General Report and the Reports of the two Commissions as well as the recommendations adopted by the Conference form the Report of the Conference which appears below.

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Iraq

H.E. Mr. L. Carducci Artenisio
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Italy

Mr. G.O. Akomolo
Assistant Director for Informatics
Nigeria

Mr. J.E. Robes
Visiting Scholar
Duke University
United States of America

Mr. Genni Kavalerov
Vice-Minister of Instrument Automation and Automation Methods and Telecommunications
USSR

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Director of Research Plans and Procurements
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INTRODUCTION

Organization, objectives and scope of the Conference

1. The first Intergovernmental Conference on Strategies and Policies for Informatics (SPIN), convened by the Director-General of Unesco on behalf of both Unesco and IBI, was held in Torremolinos, Málaga, Spain, from 28 August to 6 September 1978. The Conference was organized jointly by Unesco and IBI in accordance with resolution 2.131 adopted by the General Conference of Unesco at its nineteenth session, resolution No. 7 adopted by the General Assembly of IBI at its eighth session, and was held at the kind invitation of the Government of Spain.

2. The objectives of the SPIN Conference were the following:

(a) to exchange experience in strategies and policies in informatics, especially those aimed at ensuring the development of endogenous capacities and the optimal utilization of resources;

(b) to identify ways and means whereby informatics could contribute to economic, social and cultural development, bearing in mind the particular needs of developing countries;

(c) to clarify the prerequisites for the elaboration of strategies and policies at the national level;

(d) to draw up a programme of action for international co-operation and assistance in the field of informatics.

3. The Conference had the following main points on its agenda: present situation and future prospects of the use of informatics; experiences in the elaboration of national strategies (institutional frameworks for the elaboration of national strategies, mechanism for the elaboration of national strategies, international contexts) and policies in informatics; basic prerequisites for the effective use of informatics (manpower development, assessment and acquisition of technology, industrial capacities and research and development, information concerning informatics); applications of informatics (areas of application, development of national capabilities in the utilization of informatics technologies, informatics and socio-cultural development); regional and international co-operation - bilateral, multilateral, international standards and copyrights, institutional arrangements for follow-up to the Conference).

4. Delegates from 76 Member States of Unesco and observers from one non-Member State participated in the Conference as well as representatives and observers from seven organizations and bodies of the United Nations system, six other intergovernmental organizations, and four international non-governmental organizations. Altogether 269 delegates and 23 representatives and observers took part in the Conference.

Preparations for the Conference

5. As part of the advance preparations for this intergovernmental Conference, a significant effort to identify the relevant issues and to assess the state of activities in various national, intergovernmental and non-governmental organizations was undertaken. To this end, a series of regional consultations were organized by IBI with the co-operation of Unesco and the Member States (Baghdad Conference on National Planning for Informatics in Developing Countries (Iraq) in 1975; Regional Consultations in Manila (Philippines), Bizerta (Tunisia), Kinshasa (Zaire), Kumasi (Ghana), Rio de Janeiro (Brazil), Madrid (Spain)). A similar meeting was organized by Unesco in New Delhi (India) in 1977. The Secretariats of IBI and Unesco assembled the regional views and suggestions. In addition, a number of statistical, state-of-the-art and country studies were undertaken in co-operation with the countries concerned and within the framework of the relevant activities of IBI and Unesco. This significant effort is detailed in the background documents, and many of the issues raised and subjects considered during these sessions are reflected in the working document.

6. Preparation for the planning of this Conference also benefited considerably from two advisory groups to the two Organizations. A standing committee of IBI known as SPINCO (Strategies and Policies on Informatics Committee) met on seven occasions and was of great value to IBI efforts; it was composed of high-level government officials with responsibilities in informatics from both developed and developing countries: Messrs. M. Bouarfa and Y. Mentalechta (Algeria); Messrs. R. Saur and A. Pereira Nunes (Brazil); Messrs. G. E. Henderson

and W. Pajor (Canada); Messrs. M. Allegre, J. Caillot, D. Peronne, C. Pare, M. Delamarre and M. Robin (France); Messrs. W. Brauer and C. Rudolph (Fed. Rep. of Germany); Messrs. F. K. A. Allotey and K. B. E. Quagrainie (Ghana); Messrs. Kh. Behrouz and D. Farahmand, M. A. Montahem (Iran); Messrs. G. Al-Barrak and U. A. Al-Bayati (Iraq); Mr. L. Dadda (Italy); Mr. E. Melrose (Mexico); Mr. M. Elmandjra (Morocco); Mr. F. G. Kordes (Netherlands); Mr. G. O. Awomolo (Nigeria); Messrs. J. J. Scala, R. Villanueva, J. K. Rodríguez Cordón and Ms. M. C. Mateo (Spain); Messrs. J. L. Kulikowski, A. Radzininski and Z. Substyk (Poland); Messrs. S. Karoui, M. E. H. Ben Abdes-Selem and M. Boudaqga (Tunisia); Mr. W. R. Atkinson (United Kingdom); Messrs. Matundu Ne-N'Kueno and K. Dindi-Bungu (Zaire).

7. A group known as MINEXSPIN (Messrs. Bouarfa (Algeria); A. Danzin (France); E. I. Eller (USSR); S. Karoui (Tunisia); A. Neelameghan (India); Matundu Ne-N'Kueno (Zaire); Z. Pawlak (Poland); F. Roth (U. S. A.); J. J. Scala Estalella (Spain); P. Audoin (France); J. P. Ayrault (France); Tsibambe Kabamba (Zaire); A. J. Khitrov (USSR); N. R. Miller (U. S. A.); and I. Uygur (ITU/Geneva)) provided, as required for Unesco's convening of a category II conference, an intergovernmental body of experts which advised the Director-General of Unesco on various aspects of the Conference planning.

Opening of the Conference

8. The opening ceremony took place on 28 August at 11 a.m. in the Congress Hall of Torremolinos, Málaga, Spain, in the presence of His Majesty King Juan Carlos, Her Majesty Queen Sofía; Mr. Otero, Minister of the Presidency; Mr. Uriarte, Assistant Secretary of Industry; Mr. Balcázar, Captain General of the 9th Military Region; Mr. Alberto, Captain General of the Maritime Area of the Straits; Mr. Alfaro, Lieutenant-General-in-Chief of the 2nd Aerial Region; Mr. Hurtado, Civil Governor; Mr. Moreno, President of the Audiencia Provincial; Mr. Jiménez Hidalgo, President of the Diputación Provincial; and Mr. Merino, the Mayor of Málaga.

9. His Majesty King Juan Carlos, opened the Conference and gave the floor to Mr. Amadou-Mahtar M'Bow, Director-General of Unesco, who after expressing his thanks to his Majesty and to the authorities of the host country for their cordial welcome, greeted the representatives of Member States, representatives and observers of the organizations of the United Nations system, and intergovernmental and non-governmental organizations.

10. The Director-General expressed his profound gratitude to Their Majesties King Juan Carlos and Queen Sofía, who, by honouring the opening session with their presence, had once again manifested the personal interest they took in Unesco.

11. The Director-General then paid tribute to His Majesty King Juan Carlos, pointing out that his achievement consisted in having reconciled Spain with itself, in having the intense desire to see the Spanish people perfect their democratic institutions in a new-found harmony and build a future of peace, progress and justice for all their children. The Director-General then thanked the Spanish Government for its help in the practical preparation of the Conference and extended a warm welcome to the delegates of all countries who, by virtue of their number and their rank, demonstrated the importance they attached to the work of the Conference.

12. Finally he extended his cordial greetings to Unesco's partner in organizing SPIN, the Intergovernmental Bureau for Informatics, successor to the International Computation Centre.

13. The Director-General then went on to say that mankind had already experienced several technological revolutions all of which had profoundly marked the period during which they took place. From the advent of agriculture in neolithic times to the discovery of electricity in the last century, they had all brought about major cultural and economic upheavals in the societies which they had affected. There was every reason to believe that informatics was bringing about a comparable upheaval, and this time on a world-wide scale. There was no doubt that one of the most evident signs of this was the establishment that they were witnessing today of a planet-wide information and communication network based on the linking of computers with telecommunications, opening up immense prospects for human relations.

14. One fundamental fact was that developments in informatics over the last 20 years had been all the more amazing in that greater efficiency had gone hand-in-hand with the lowering of costs. The key to those changes no doubt lay in the miniaturization of electronic components. In a recent report it was stated for example that today a micro-processor only a few millimetres square had the same processing capacity as a computer which 20 years ago represented the acme of technological progress and which took up a whole room. Furthermore, a component which cost 350 francs ten years ago cost only 1 centime now.

15. The consequences of that transformation were vast. They raised legitimate hopes but they also entailed grave risks. They might either serve man or enslave him. On the one hand they made it possible to multiply almost limitlessly small machines of low cost and high performance, and to decentralize informatics networks, thereby providing individuals with access to an increasingly broad range of data banks hitherto reserved for a small number of privileged persons. Tomorrow it would be possible to call upon informatics in all the daily aspects of life where its usefulness was essential. The phenomenon could be synonymous with freedom. But at the same time, those developments were leading to the establishment of a system of universal satellites carrying images, data, and sound which made all other forms of transmission pale into insignificance.

16. One could thus see looming on the now not too far distant horizon the possibility of a redistribution of world power zones, on the basis of the monopolization of the nerve centres of such a system. Over and above the present inequalities in the distribution of resources and means between the north and the south of our planet, which they were now trying to mitigate, they would see an inequality, within the industrialized world itself, between one or two States, or even one transnational corporation, and the other States which would be reduced to the status of intermediaries or peripheral agents.

17. As at each of the crossroads in mankind's long history, the effects of progress were not the result of a fate decreed by external forces: in the last analysis they depended upon man's own wisdom.

18. Informatics opened up such tremendous vistas for modern societies that any failure to master it would mean a life of permanent subordination. For informatics was more than a form of power: it was a power system. The technology which it involved was not just one form of technology among others but an ability to make use of other techniques, to give or to refuse access to a whole range of scientific data and knowledge and thus to design new models of development.

19. This was why dependence in informatics might bring in its wake an ever-increasing variety of forms of servitude in many areas of life. Any nation which wished to be a sovereign nation must therefore give consideration to ways of achieving independence in informatics - which meant informatics geared to its own needs and aspirations. Such an achievement, which was seen ever more clearly as a crucial factor in the establishment of a more equitable international order, was a challenge to the international community, whose ability to overcome its selfishness, to combine its aspirations and its forces and to make fuller and more far-reaching use of its methods of co-operation was seen, now as never before, to be decisive.

20. But if the appropriation of informatics by any society was necessarily of a collective nature, it also required a democratic approach to be truly liberating. For it was society as a whole which must be made familiar with informatics if it wished to control it and make it serve needs that were truly those of mankind.

21. Otherwise it might be taken over by a few key departments or centres of power which might be isolated from their socio-cultural environment and thus bound to follow imported models and foreign strategies. The establishment of that infrastructure was a matter for political decision: one field rather than another would be supplied with the appropriate informatics facilities as a result of priorities established by the State. It was to be regretted that priority was still too often given to management and control functions of an economic, and sometimes even political and military nature, at the expense of research, cultural promotion activities, education, health services, public transport or irrigation, to name but a few areas of basic importance for the development of the individual and the well-being of society.

22. Unesco, for its part, had been working tirelessly on the two fronts to which it was committed: first of all to provide all States, and in particular those of the Third World with all the assistance they required to train specialized staff, to educate professional users and to promote a general "informatics culture", and then to give practical assistance in the introduction of informatics into specific societies where its unfamiliarity would create a risk of cultural, if not social, disruption.

23. For nearly ten years now Unesco had been encouraging the establishment of a worldwide UNISIST network. The work done within the framework of UNISIST was designed to foster the exchange of scientific and technical information between specialists in all countries, to ensure effective intercommunication between different systems of information and different branches of science, to co-operate with all countries desiring access to scientific documentation, to develop the resources and means necessary for rational use of an automatic system and to contribute towards the training of the requisite staff.

24. One of the major questions that arose in that field was that of selecting the informatics techniques best suited to each country's "take-off" level and ultimate goal. In this respect, mini-computers and micro-processors seemed to open up the richest and most promising horizons.

25. This was not to say, of course, that those should invariably be selected in preference to "full-scale" computers but that advantage should be taken of the opportunity they provided - particularly for the least advanced countries - to avoid some of the worst distortions experienced by the more highly industrialized countries and to introduce computerization simultaneously at the lower as well as at the upper end of the scale. It was by so doing that those countries would be able to develop an informatics system that was adapted to a multiple technology, open to every innovation and responsive to internal potential of every kind. In the longer term it would also enable them to plan for the production of equipment and software that were specifically designed to bring out their autonomous development capabilities.

26. There was reason to hope that education, which was a fundamental factor of development, would in turn be profoundly revolutionized by a decentralized and widespread informatics system. With the exception of research, the use of informatics in education systems had so far been restricted essentially to programme planners and administrators, and also, to a lesser extent, to the assessment of knowledge. For some ten years now, however, many universities and certain private establishments had been trying out systems of simulation and of teaching using mini-processors - and the initial results had been extremely encouraging.

27. Those systems, based on control by the pupil himself of an automaton - either real or simulated on a screen - had made it possible, in particular, to perfect new methods for the teaching of mathematics and logic. They had also

demonstrated the many opportunities that arose for developing imagination, memory and social communication. There was every reason to suppose that computer games would be used on a massive scale for educational purposes in the near future. The advantage they had was that, unlike most of the present educational games - which imposed their own rules on the child - those games allowed the child to construct his own rules of play for himself, the computer being no more than an obedient tool that made an unlimited number of different combinations possible.

28. To this end, Unesco was encouraging pedagogical research work and technical studies aimed at the development of low-cost teaching materials. The Organization was convinced that such materials could be produced even by the Third World countries provided they stepped up their mutual co-operation. It was prepared, for this purpose, to undertake projects and carry out feasibility studies and to set up research and development teams capable of designing new equipment prototypes - making use, in particular, of the various possible applications of microprocessors. Unesco considered that such was the way in which informatics would be able to play a vital part in the assertion of cultural identity of all peoples. Instead of favouring domination by one particular civilization or language, informatics, once at the service of the various peoples, was capable of fostering the development of endogenous cultures and technology by giving qualitative support to their autonomous creative abilities.

29. His Majesty King Juan Carlos next called upon Mr. Fermín A. Bernasconi, Director-General of IBI. In his address to the Conference the Director-General of IBI said that all the countries associated with IBI's activity were well aware of the importance attributed by Spain to informatics, and the fact that the SPIN Conference was being held on Spanish territory underlined this importance for those not previously aware of it. More explicitly, the presence of Their Majesties was an acknowledgement, of the fact that informatics as an economic, social, cultural and political phenomenon reached the highest level of the country's leadership. For this presence and this acknowledgement, he whished to express on behalf of IBI their gratitude to His Majesty, while paying a respectful tribute to Her Majesty the Queen.

30. The Director-General of IBI began his address with a brief history of IBI up to the present Conference. He explained that the idea of holding the Conference had emanated from the Strategy and Policies for Informatics Committee (SPINCO) set up by IBI in 1974. Unesco had expressed its interest and its desire to be associated with that idea.

31. The General Assembly of IBI had approved for inclusion in the Organization's programme of activity, the preparation of the SPIN Conference which was to be organized in co-operation with Unesco.

32. Algeria and Brazil, both SPINCO members, had for their part submitted to the General Conference of Unesco a resolution along the same lines, which was also approved. The Director-General of IBI stated that his speech would deal with three fundamental concepts: informatics and development; the new context, the New Informatics; and informatics flow and data banks, and would conclude with a number of reflections.

33. He noted that IBI's associate in the organization of the present Conference - Unesco - was a founder of the former International Computation Centre, an organization whose gradual transformation process over a period of almost five years, had led to the present IBI - the Intergovernmental Bureau for Informatics. That body was set up in December 1974 and its field of competence coincided exactly and exclusively with what was today one of the leading and most important world industries.

34. He acknowledged Unesco's constant support, and its understanding of the many problems that a chrysalis had to face before becoming a butterfly able to take wing. Such support had made it possible for IBI, the sole intergovernmental organization specifically devoted to informatics, to exist today as a vigorous organization in full development.

35. The vigilant and constructive support provided from the outset by Mr. Amadou-Mahtar M'Bow, Director-General of Unesco, had enabled this potential to be translated into reality and through the efficient work of the respective Secretariats, he said, they were now establishing the foundation of what might someday be the new international information order, an essential part of the process of bringing into existence the new international economic order.

36. He had no doubt about the world-wide follow-up to the SPIN Conference in the near future; there were already certain indications of this, as reflected in the fact that the Economic and Social Council of the United Nations, in a resolution dated 1 August 1978, had invited the Directors-General of Unesco and IBI to submit a report on the results of the SPIN Conference.

37. They were also sure that the SPIN Conference would be a milestone along the road which would lead mankind into a new age. The time was ripe for a decision of crucial importance. Today's developing countries were those which had missed out on yesterday's industrial revolution; those of tomorrow might well be the countries which would miss out on the informatics revolution which was taking place today.

38. On 5 July last in Geneva, during the ECOSOC meeting which approved the resolution on the SPIN Conference previously referred to, Mr. Kurt Waldheim, Secretary-General of the United Nations, had noted the failure of the development efforts undertaken in the Third World countries. Hence the question to be answered was whether the time had come to adopt a different approach and to think in terms of helping those countries to equip themselves with informatics systems aimed at improving or creating the required management infrastructures. The lack of such structures was a constant factor of underdevelopment.

39. The utilization of informatics was therefore necessary as far as development was concerned; in all countries, regardless of their size, informatics had economic, political and socio-cultural implications. As a result of technological progress, it had grown at a rapid and sustained pace which had, so far, made it possible to foresee future developments with reasonable certainty. That was no longer valid. A breaking point in that continuity had been reached, and all one could predict now was that a new context would come into existence and that it would be characterized on one side by the massive presence of informatics in each and every manifestation of mankind, and, on the other, by the integration at world level of informatics systems into large networks.

40. The first phenomenon drew its origin from the micro-processor. Today, in a chip of less than 1 cm² and costing under $20, 50,000 transistors could be placed; tomorrow, it was already being announced, this same chip would have the capacity of the systems of the highest power range known today.

41. This had an impact on education: what type of personnel should be trained? On industry: what type of industry? On national security: technological dependence assumed different forms. The socio-cultural impact of informatics had to be reviewed in the light of that new reality, which could bring about a return to life in the small community, with all the advantages, but none of the disadvantages, of the large urban conglomerations. A humanized informatics oriented towards the individual was being defined.

42. That whole new context, which gave shape to a new informatics closer to man and more in keeping with the requirements of developing countries, needed the support of a second dimension previously mentioned - the combining of informatics technology with telecommunications.

43. That relationship was not devoid of imponderables and the interests involved were of a greater magnitude than those with which many countries could deal.

44. The trends were taking shape before their very eyes. The expansion of the market led producers of informatics products to enter the field of telecommunications, and the latter, similarly, to penetrate that of informatics.

45. By being constantly transgressed, the virtual frontier which existed between the two domains had become blurred and tended to disappear, due, particularly, to this convergence of technologies. The world was appearing to move towards a confrontation in the short term between the principal protagonists of informatics and telecommunications; a confrontation which could produce significant modifications in the commercial and technological context and whose effects would certainly be reflected in each and every country.

46. In the formulation of its recommendations the Conference should bear in mind that new context whose development was difficult to predict, since it was in such a new context, and not in that existing at present, that its recommendations would be implemented.

47. As previously mentioned, two main axes were traced for informatics development; the proliferation of highly reliable, powerful and low-cost information processing equipment, on the one hand, and on the other, the appearance of new digital transmission systems and specialized satellites which enabled data to be transferred at great speed and low cost, irrespective of the distances involved.

48. The combined effects of these two axes of informatics development would intensify a phenomenon which was already very marked, especially among the more advanced countries and which would shortly be a subject of concern for other countries. He was referring to the flow of data across frontiers and their accumulation in large banks.

49. The ultimate objective of all informatics infrastructures, independent of their technical complexity, was information handling.

50. To consider the problem of information circulation was to enter into the very heart of the debate on an essential requirement of the international economic order. That debate involved many and varied political, economic and socio-cultural aspects.

51. Those who advocated the free flow of information were often opposed, on the grounds of State security, the rights of physical and juridical persons, copyright, and political, social and economic responsibility in general. A country using foreign models and data banks must fear, justifiably, becoming the centre of a cultural conflict; it must be concerned at the possibility of ultimately being the victim of cultural homogenization. Other countries required that the integrity and right of access to their data banks existing abroad be guaranteed, a question with extensive implications in the national security sectors.

52. The problems of data collection and their transmission across frontiers and in outer space, as well as the establishment of tariffs associated with those processes raised a multitude of still unsolved problems which could adversely affect the smooth flow of information which, from both the economic and technological standpoints, was a necessity.

53. In the last two years there had been a multitude of initiatives and in that respect there must be recognition, as far as Europe was concerned, of the pioneer action of OECD. It was felt that the time had come for all countries, and especially the developing nations, to have access to this subject which was universal.

54. A generally accepted conclusion, and one that had already been mentioned, referred to the need to make the utilization of informatics universal in order to contribute to economic, social and cultural development. The present great technological concentration must be transformed so that all countries, large and small, might assume their own responsibility in the field of research, development, industrialization and adaptation of informatics, ensuring the transfer of knowledge between them.

55. The preceding concept and the others

expressed in relation to data transmission, confirmed his impression that international co-operation had excellent possibilities of success in helping to bring about a new international order which should reflect respect for the private life of citizens, ensure intelligibility in the international exchange of information, and respect for the sovereignty of States.

56. In conclusion, the Director-General of IBI reverted to the concepts with which he began his statement. The fact of holding the SPIN Conference in Spain also prompted the wish to pay tribute to a country which was in the forefront as regards informatics policies, which was aware of the international dimension of the informatics phenomenon, to the extent of hosting on its territory the IBI Regional Centre for Education in Informatics in Spanish (CREI).

57. To complete this tribute, he wished to express his most sincere gratitude to the Spanish officials who had contributed to the success of the Conference, and to the Kingdom of Spain for its generous and traditional hospitality.

58. In his address His Majesty King Juan Carlos, stressed that informatics was a science and technique which still filled the uninitiated with feeling ranging from incredulous scepticism to a blind faith in scientific progress as a solution to the problems of mankind. Informatics merited the attention of governments and international organizations, which accepting the challenge that such progress represented for them, had decided to send their representatives to Torremolinos. This was because they knew that computers, with their amazing memories, calculating capacities and rapidity, constituted a powerful tool in human hands; hence man should, and did have an obligation to understand and control the potential that they offered.

59. It was now common knowledge that informatics was an irreplaceable instrument for coping with the profuse information which reached man daily and that it placed at his disposal the data which formed the basis for all the economic and social development of communities. Until recently such information was neither assimilable nor apprehensible, but today, thanks to the computer and its capacity for calculating and storing information, one could look to a future in which man would have access to all those social elements that would enable him to change his destiny.

60. But like any scientific achievement, like every victory that man achieved over himself, it had no potential for development unless it was shared with others. Telecommunication in this sense was and should be the vehicle for informatics. Only by bringing technical and scientific advances and economic and social experience within the reach of everyone would there be any hope of achieving the more harmonious development of mankind.

61. His Majesty King Juan Carlos concluded by stating that man was standing on the threshold of a new era in which informatics was about to revolutionize his life. To provide it with the means it required, to channel it and above all to humanize it was, he said, the challenge which progress had set for all countries and the real reason why they decided to send their representatives to the Conference. The results it achieved would give reason to hope that discussion and the exchange of opinions and experience might prove to be the sole way for men to live in peace. Thus science would once again attain its desired goal, one which was directed towards the development of man's own capacities. His Majesty King Juan Carlos then declared the Conference open.

Work of the Conference

62. Following the opening ceremony, the Conference, on the proposal of the head of the delegation of Argentina, seconded by the heads of the delegations of Lebanon, Saudi Arabia and Italy, elected by acclamation the head of the delegation of Spain, His Excellency D. José Manuel Otero Novas, Minister of the Presidency of the Government, as its President.

63. His Excellency, D. José Manuel Otero Novas, on behalf of his Government and in his personal capacity, thanked the participants of the Intergovernmental Conference on Strategies and Policies for Informatics on his election as President of the Conference.

64. In his opening remarks His Excellency D. José Otero Novas pointed out that the main working document prepared for the Conference raised extremely important issues concerning informatics and would most likely serve as an excellent basis for further discussions. He expressed the hope that the Conference would represent a turning point in the global development of informatics.

65. The Conference then adopted its Rules of Procedure, after having changed the wording "Unesco and IBI" in Rule 1 to "Unesco and/or IBI".

66. The Conference then elected unanimously other members of the Steering Committee, which was constituted as follows: President, His Excellency J. M. Otero Novas (Spain), Minister of the Presidency; Vice-Presidents: Mr. O. G. Vélez (Argentina), Subsecretary of State for Informatics; Mr. P. L. Yen (China), Head of the Bureau of Basic Sciences, National Commission of Science and Technology; Mr. J. C. Pelissolo (France), Director of Electronic Industries and Informatics, Ministry of Industry; H. E. M. F. Vakil (Iran), Deputy Minister of Plan and Budget Organization for Informatics; Dr. H. A. Albayati (Iraq), Director-General of NCC; H. E. M. L. Carducci Artenisio (Italy), Permanent Delegation to Unesco; Mr. G. O. Awomolo (Nigeria), Assistant Director for Informatics; Mr. J. E. Fobes (U. S. A.), Visiting Scholar, Duke University; Mr. Genni Kavalerov (USSR), Vice-Minister of Instrument Automation and Automation Methods and Telecommunications; and Dr. Ivan Mecanovic (Yugoslavia), President of the Council for Informatics; Rapporteur-General, Mr. M. Y. Mentalechta (Algeria), Director of Scientific and Technological Research; Chairman of Commission I, Mr. Matundu Né-N'Kueno (Zaire), Head of Programme, Presidential Informatics Department; Chairman of Commission II, Mr. Sergio Mota Marín (Mexico), Co-ordinator, National Information System.

67. At the end of its first plenary meeting, the Conference adopted its agenda and established two commissions. Commission I was assigned consideration of item 8 (Basic prerequisites for effective use of informatics) while Commission II was assigned consideration of item 9 (Applications of informatics). Both commissions examined the above items of the agenda on 30 and 31 August 1978 and approved their reports and recommendations in the morning session on 4 September 1978.

68. Both commissions elected unanimously their Vice-Chairmen and Rapporteurs. The officers of Commission I were the following: Chairman, Mr. M. Ne-K'Kueno (Zaire), Head of Programme, Presidential Informatics Department; Vice-Chairmen: Mr. R. Angelinov (Bulgaria), First Vice-President, Committee for the Unified System for Social Information of the Council of Ministers; Mr. L. Inguongui (Gabon), Secretary-General for Informatics; Mr. G. Marx (Federal Republic of Germany), Ministerial Counsellor, Federal Ministry for Research and Technology; Mr. M. Salah (Jordan), Director, Computer Systems Department, Royal Scientific Society; and Mr. L.J. Díaz Zuloaga (Venezuela), Director-General, Planning and Budget, Ministry of Environment; Rapporteur, Mr. R. Witoyo (Indonesia), Staff of Vice-President.

69. The following Vice-Chairmen and Rapporteur were elected for Commission II: Chairman, Mr. S.M. Morín (Mexico), Co-ordinator, National Information System; Vice-Chairmen: H.E. S.H. Chaudhury (Bangladesh), Minister of Cultural Affairs and Sports; Mr. R. Fernández Monert (Cuba), President, National Institute of Automated Systems and Computer Technology; Mr. G. Zillmann (German Democratic Republic), Vice-Minister of Science and Technology; Mr. M.L. Dieye (Senegal), Director of Informatics; and Mr. W.R. Atkinson (United Kingdom), Director, Central Computer Agency, London; Rapporteur, Mr. M. Boudagga (Tunisia), Director of Research Plans and Procurements, National Informatics Centre.

70. The Conference considered, in plenary meetings, item 7 (Present situation and future prospects of the use of informatics: Experiences in the elaboration of national strategies and policies in informatics) from 28 to 30 August 1978 and item 10 (Regional and international co-operation) on 4 and 5 September 1978. The Conference discussed the draft recommendations submitted by delegations on 5 and 6 September 1978.

71. During the Conference several demonstrations were organized in order to further delegates understanding of the potentialities of new techniques and as a contribution to international co-operation. Through a computer terminal the Unesco Data Bases were interrogated by the participants; these included the Unesco documentation, publications and library acquisitions service (CDS), Data Retrieval System for Social and Human Sciences (DARE) and educational facilities' data bases.

72. IBI demonstrated its Automated Informatics Documentation System (AIDS), as well as a selection of 15-minute audio-visual courses on practical aspects of information in Spanish which had been produced by the IBI Regional Centre for Education in Informatics, Madrid.

73. The Centre of European Informatics Network (CREI), Italy, with the assistance of the Spanish Telecommunications Administration established an experimental link with data banks of the European Informatics Network and showed a short film describing the purpose and functioning of the Network.

74. The Brazilian delegation organized a demonstration showing an audio-visual course on the technique of programming and design of hardware equipment. A large number of delegations distributed printed material describing industrial, educational and other aspects of informatics in their countries.

75. At the final plenary meeting on 6 September 1978, the Rapporteur-General presented the draft final report; this, together with the draft recommendations concerning agenda items 7, 8, 9 and 10, was examined and then adopted by the Conference. The report and recommendations adopted are reproduced in Chapters I to IV of this report.

Closing meeting of the Conference

76. Prior to the President's formal closure of the Conference, the Director-General of Unesco and the Director-General of IBI addressed the participants, and Mr. Luis M. Laurelli, head of the Argentine delegation, conveyed the delegates' gratitude to the Government of Spain and to the organizers of the Conference.

77. Mr. Amadou-Mahtar M'Bow, Director-General of Unesco, in his closing speech, thanked the King of Spain and Queen Sofía for having honoured the opening meeting of the Conference with their presence and expressed Unesco's deep gratitude to Their Majesties. He also stressed the Organization's appreciation of the solicitude shown by the Spanish Government towards the Conference in conferring the leadership of the large delegation of Spain on the Minister of the Presidency of the Government, Sr. Don José Manuel Otero Novas. The Director-General of Unesco thanked the President for the courtesy, patience and efficiency with which he had guided the discussions and, as a token of the gratitude of all, presented him, on behalf of Unesco, with the silver medal established by its Executive Board to honour those who had made an invaluable contribution to the Organization's activities. He extended his warm thanks to the Governor, the President of the Diputación and the Mayor of Málaga, whose assistance had been so helpful in organizing the Conference. He then thanked the Rapporteur-General and the Chairmen and Rapporteurs of the commissions for the important and difficult work they had accomplished in order to enable the Conference to complete its task within the allotted time. On behalf of Unesco, the Director-General also extended his thanks to the delegates and representatives of sister organizations of the United Nations system, intergovernmental organizations and international non-governmental organizations.

78. The Director-General said that the first

point to be noted, as shown in the discussions and recommendations adopted by the SPIN Conference, was the need to develop the use of informatics, which had become a key tool of economic and social progress. The volume of information required for the establishment of national development plans was such that it could no longer be analysed with the necessary speed and efficiency without computerized means. The manifold applications of informatics opened up, moreover, vast prospects for the development of knowledge, the flow of ideas, communication between individuals and peoples, improvement of the productivity of labour and the organization and management of administrative undertakings such as modern commercial enterprises. And yet, while affirming the need to encourage recourse to informatics, some delegates had expressed a degree of scepticism concerning the possibility of access by all nations to the most appropriate informatics techniques. It could not be denied that the hopes placed in the founding of a new international economic order had scarcely been realized during the period since the General Assembly of the United Nations had launched its appeal in 1974.

79. Turning to the role of informatics in development, the Director-General drew attention to two points: first, the developing countries, often because of the scarcity of their material and manpower resources, concentrated their computer resources almost exclusively on management problems; second, by means of more frequent and effective exchanges and contacts, the developing countries could benefit from the experience gained elsewhere. The answer to the question "How is computerization to be carried out?", said the Director-General, was that informatics called increasingly for the adoption of strategies based on the requirements of the overall plan or general programme for economic, social and cultural development. Choices became meaningful only if they had full regard for specific national requirements, were perceived as a coherent whole and were designed to ensure that any form of alienation was avoided. In the present state of affairs, many industrialized or developing countries had no choice but to obtain their equipment on the world market. The only course of action open to the majority of countries was thus to try to influence that market by encouraging the most open form of competition and by studying in the most minute detail the whole range of products offered. Unesco was ready, in co-operation with the appropriate bodies, to assist Member States in taking concerted action or to help them by placing highly qualified experts at their disposal or, if they so wished, by advising them on the formulation of general or sectoral informatics programmes. Speaking of employment, the Director-General said that, at a time when unemployment and underemployment were no longer the unenviable privilege of the developing countries, the risk of further aggravating them by extending the use of informatics was always present in their minds, even if there was a hope that by means of informatics employment openings might be created in other sectors. That raised the important problem of taking the whole range of social and economic factors into consideration when planning and implementing action in informatics.

80. This brought the Director-General to a third point, which, he said, gave rise to questions and also some misgivings: just as industrial progress had helped to accentuate the differences between States, scientific progress in general and that of informatics in particular were now accelerating that process. Even disparities between different developing countries might be accentuated. Some people, he said, wondered whether informatics had only beneficial effects on the organization of society, for, although its influence on political structures was not decisive, it was not negligible. There might be a great temptation for those in power to use computers to consolidate that power. In many countries, such serious problems as poverty, unemployment and inflation, to mention but a few, had assumed such proportions that they monopolized political considerations and absorbed resources to such an extent that computerization was relegated to a secondary level. One of the merits of the Conference was that it had probably helped to alert the leaders of Member States to the potential of informatics and to the need to control it in order to promote development more fully.

81. Speaking of international co-operation, the Director-General said that it should provide the methodological and technical means as well as the resources needed for the establishment and application of national policies for informatics in keeping with each country's characteristics and under the full control of States. International co-operation could be beneficial to all, and it should involve all States if national egoism was to give way to real solidarity accepted by everyone, for the benefit of all the peoples of the world. The international community should strive to find new avenues of co-operation in the field of informatics, taken in the broadest meaning of the term, for fresh thought must be given both to the dimensions of such co-operation, in order to extend it, and to its content, in order to give it a more appropriate and equitable form. The Conference had reflected a wide measure of agreement among Member States as to the goals to be obtained, and the differences of opinion expressed and fine distinctions made concerning the means to be employed only showed that imagination must be applied in order to discover more appropriate approaches. Unesco should therefore redeploy its means and rethink its mode of action in informatics in order to take account of the recommendations made by the Conference.

82. Mr. Fermín Bernasconi, Director-General of IBI, pointed out in his closing address that four years ago, when the two Organizations started to plan the SPIN Conference, they had in mind two basic objectives: to present the concept of informatics as a wider concept than that of computer sciences and to achieve acceptance of the importance of national strategies for informatics. As the SPIN Conference had demonstrated, those objectives had been achieved; and as

one of the participants had stated: "This Conference is a first-time event in the history of mankind". That statement might be an exaggeration but the consequences of the Conference on the national and international development of informatics could hardly be overestimated.

83. Mr. Fermín A. Bernasconi then described the direct consequences of the Conference and the discussions on the future programme and activities of IBI. He identified four basic areas where particular efforts should be envisaged. Co-operation between nations should be fostered in order to exchange experiences in the formulation and implementation of national strategies and policies for informatics. There should be exchange and transfer of software between institutions whose activities, and experience were similar in scope as well as the transfer of technology in the more general sense of the word without any kind of discrimination. Finally particular attention should be paid to the education, training and re-training of users, specialists and the general public. He stressed, furthermore, the growing importance of the large-scale integration of components which might open up new horizons for the developing nations, standardization in the different fields of informatics which would enable nations to co-operate more efficiently, and the phenomenon of transborder data flows which should be regulated in the common interests of nations. As regards the latter point, he added that IBI would provide in its 1979-1980 draft programme for the holding of a conference on transborder data flows at the end of 1979. It would not be an intergovernmental conference, but would follow the lines of those held in Florence (1972), Mainz (1974) and Baghdad (1975).

84. Mr. Luis M. Laurenti (delegation of Argentina), speaking on behalf of the participants, paid tribute to the work of the Conference. He expressed their gratitude to Their Majesties and to the Government of Spain, to the local authorities for their hospitality, to the President, Mr. José Manuel Otero Novas, for the excellent conduct of the debates, and to the Directors-General of Unesco and IBI for their Organizations' contribution to the preparation of the SPIN Conference.

85. Mr. José Manuel Otero Novas, President of the Conference, after expressing his thanks to the Director-General of Unesco and the Organization in regard to the award of the silver medal of Unesco, stated that "it was neither exaggerated optimism nor rhetoric that prompted him to describe the overall result of the Conference as highly successful. The recommendations and resolutions that they had adopted dealt with the most vital questions in the sphere of informatics. They outlined strategies and policies that would, perhaps, enable countries to re-examine some of their analyses for developing their endogenous capacities and to orient their foreign procurement policies; they established certain basic prerequisites for the efficient utilization of informatics, among which he emphasized that of personnel training in its twin aspects of preparing specialist staff at every level and the promotion of what might be termed general informatics culture; they gave very special attention to the various fields of application and established a series of criteria concerning priorities that would surely be of great value to many countries that had to incorporate informatics procedures into their everyday management operations against a background of limited economic resources and acute basic needs. Finally, they set out a number of suggestions concerning co-operation not only at the bilateral and regional levels, but extending to the wider international sphere.

86. Mr. José Manuel Otero Novas, declaring the Conference closed, concluded with an expression of thanks to the Directors-General of Unesco and IBI, the members of the Steering Committee, the Secretary-General and the Rapporteur-General, members of the Secretariat and the personnel of the Congress Centre for their important contribution to the success of the Conference.

Present situation and future prospects for the use of informatics: experience in the elaboration of national policies and strategies in informatics

(a) The importance of and the need for informatics

1. Informatics is an instrument ideally suited to promote economic and social development. Covering as it does such a wide range of applications, it makes it possible to master the information necessary for production, management, assistance in decision-making, planning, control and research, and also gives access to all types of knowledge. This is a view which was expressed by the majority of countries represented. Informatics, an undisputed factor of progress, should not be considered, as several countries remarked, to be some kind of panacea which could be used to solve all problems with no risks involved. One delegate underscored the significance of informatics as a modern vector or carrier of civilization.

2. The experience of the industrialized countries in this field proved that informatics, which is born of progress, could, in its turn, speed up development. Once mastered by the developing countries, it could, through improved management of resources, reduce the gap which separated them from the richer countries. It was, therefore, an element of the search for a new international economic order which was now in progress.

(b) The need for strategies and policies in informatics

3. It was a fact of history that informatics had often been introduced in a rather haphazard way under the dual pressure of specific problems needing to be solved and the commercial activity of the suppliers. Investment undertaken in such circumstances had not always had the desired effect. This had been particularly true of the developing countries.

4. The recognized importance of what was at stake in the development of informatics, the rapidity of technological progress, the commercial environment, the constraints inherent in developing the use of computers, the repercussions on major national policies and the magnitude of both the human and the material resources involved militated in favour of careful preliminary reflection and a longer-term approach.

5. This view was shared by the majority of delegates. It had already been reflected in the practice of several countries in formulating national strategies and policies and establishing institutions engaged in control, training or the provision of services and, in some cases, in industrial production. Other countries were considering following a similar course of action. From statements made, it was clear that although they were convinced of the need for policies and strategies, the different countries' approach to implementation reflected varying degrees of comprehensiveness and dependence on individual initiative. The difference in attitude was particularly marked in respect of the human and material resources invested, in the rate at which informatics was developed and in the significance accorded to the capacity of industrial production.

6. Some countries had not, up to the present time, found it necessary to adopt a single, comprehensive national strategy and policy. In some cases this reflected their political or socio-economic situations: in others it was explained by their potential for industrial production and the provision of services which had freed them from some of the constraints imposed on the developing countries. Independent of the social and political system of government there seemed to be consensus that informatics policies should receive high-level attention by government authorities. The extent to which decentralization of authority and control should extend would differ, however, among various governments. Basically this question concerned the extent to which the State could manage to approach the economy and related policies in a planned way thus facilitating the controlled development of informatics. It had to be stressed that developed countries also needed to use their resources rationally in the widespread growth of informatics and for developing countries an efficient approach to planned growth was especially significant.

(c) The conditions necessary for the development of informatics

7. The following points were submitted by several delegates of countries which had already introduced strategies and policies for informatics as well as a suitable institutional framework, as being, in their experience, prerequisites for the rational development of the use of computers. A number of delegates stressed the importance they attached to the creation at national level of institutes or centres for training, research and administration.

8. Reference was made to action to be taken in the following fields:
education and training;
the development of endogenous know-how, particularly in respect of software;
preliminary studies of the demand for processing and of the resources to meet it at both national and sectoral level;
standardization and regulations;
telecommunications;
procurement policies;
industry and services;
mobilization of financial resources;
international co-operation;
planning of development of informatics;
establishment of national computer centres.

9. Delegates were unanimous in recognizing the priority which should be given to education and training. Training should be provided both for future specialists (programmers, analysts and engineers) and for future users. Several delegates of developing countries stressed the need for the training of trainers and periodic refresher courses to keep abreast of technological development. In order better to ensure the dissemination of knowledge of informatics in society and its rational use in all sectors, certain delegates called for informatics education to be introduced in universities, secondary educational establishments and even primary schools. Some delegates mentioned the importance of organizational and administrative science as an essential ingredient for establishing effective planning and co-ordination of strategies and policies and others called for greater attention to the question of finding solutions to related structural problems associated with policy matters in government planning.

10. Considering the training provided by the manufacturers to be qualitatively and quantitatively inadequate, and limited to a single type of equipment, several countries had created national informatics training institutions.

11. Recognizing the costliness of purchasing software, and in order to reduce dependence in that regard, several delegates from developed and developing countries recommended more active participation by users in software design.

12. The various training and information activities would make it possible to prepare a propitious terrain for the rational and swift utilization of imported technology.

13. The prospect of setting up a national information network implied the broadest possible concerted approach. That could only come about to the extent that endogenous capacity existed for carrying out studies. Such capability might be developed by having temporary recourse to selected outside assistance.

14. In the same vein, several delegates stressed the importance of adopting standards with a view to promoting and facilitating the exchange of information and the common use of software by means of similar applications.

15. Common use of the same resources called for the regulating of relations between users, on the one hand, and between users and suppliers on the other.

16. Some delegates thought that contracts for the purchase of equipment or services, which in their view always favoured the suppliers, should be reviewed in such a way as to guarantee compatibility with already existing systems, security of operation and the elimination of all discrimination as regards prices and quality of service.

17. All speakers recognized the great upswing in the development of tele-informatics, as well as the advantages and efficiency of remote access and processing. Consequently the data transmission component should be taken into account in the elaboration of telecommunication programmes. Several developed countries reported on their experience and achievements in that connection.

18. It was recognized that national production of computer equipment conferred greater independence on a country and hence gave it greater security. Nevertheless, considerations of an economic nature, linked more specially with market limitations, had led certain countries to postpone plans for industrialization. The socialist countries had adopted a plan for well-distributed and complementary production. Some developing countries, with policies based on voluntary initiative, had undertaken selective national production, whereas others favoured action within a subregional or regional framework.

19. Some developing countries stressed the difficulties in financing projects in informatics and considered that the development of informatics was slowed down as a result.

20. Since the idea of the autarchic (self-sufficient) development of informatics was excluded, international co-operation was seen as an indispensable factor in the promotion of informatics, especially because of the human and material resources that it could make available to the less-favoured countries.

(d) The problems of informatics

21. Delegates from different countries drew the attention of the Conference to the adverse aspects of informatics and the problems it could present.

22. It was recognized that there was a rapid pace of change within the field of informatics and a need for governments to monitor such development because the computerization of society, in addition to its desired primary effects, might also have negative secondary effects. When

planning and regulating the introduction of informatics systems in administration, education and production, governments were thus invited to take into account all wide social, economic, human and political effects of those far-reaching changes in styles of work and life and national employment structures. They should be aware of the difficulties and complexities in estimating the true overall costs in monetary and human terms of introducing, maintaining and updating informatics systems.

23. Certain delegates, for example, warned against the vulnerability caused by the fragility of computerized systems, both in developed and developing countries. It was also recognized that informatics could have a harmful effect on the private lives of citizens, on employment and the quality of employment and, lastly, on social relationships, by the forms of dehumanization that it introduced. Furthermore, the present concentration of technology and research potential in a limited number of countries and multinational firms was likely to accentuate monopolistic trends. The consequences could be serious, both through the strengthening of strangleholds on the international flow of information and the impairing of opportunities for a free choice of society itself.

24. Without better organization of the transfer of technology, the gulf separating the developed countries from the developing countries was, as emphasized by several speakers, in danger of growing even wider and thus compromising the prospects of a new international economic order.

(e) Co-operation and exchanges

25. The promotion of international co-operation was already recognized as a necessity and as a prerequisite for the development of a form of informatics that would benefit the entire community. Delegates, when discussing this subject mentioned the following areas for co-operation:
training and education;
exchanges of information concerning experiences;
the establishment of programme banks;
the standardization of products and procedures;
the creation of more ethical relations between suppliers and purchasers of equipment and services;
access to data banks, existing or planned;
the organization of technology transfer;
the development of projects of a socio-educational character (health, education, etc.) for the benefit of developing countries.

26. As far as those themes were concerned, the forms advocated for co-operation and exchanges were varied but not mutually exclusive. Certain developed countries expressed a preference for bilateral co-operation. The majority of speakers, however, thought that such co-operation should be complemented by the development of relations at the subregional, regional and international levels. In considering the approach to co-operation the value of bilateral links and mutual co-operation was stressed, by no means only for developed countries. In fact, for developing countries, such approaches might be particularly useful to promote growth and complementary actions. Regional and subregional co-operation was also advocated as a valuable contributory force for development in the informatics field. In this case also this modality had widespread appeal for countries at all levels of development. As a good example of multilateral co-operation, one delegate pointed to the SPIN Conference itself and to the related programmes of Unesco with its almost universal membership.

27. Those delegates who referred to the question of the institutional framework of international co-operation expressed the view that there should be a greater commitment and a greater measure of responsibility on the part of the institutions of the family of the United Nations in regard to the various fields of informatics.

28. To sum up, the principal aspects of informatics and its consequences were referred to, the risks involved were reviewed and emphasis was placed on the precautions to be taken in order to ensure that informatics might be, as one delegate put it, a blessing rather than a curse for mankind

Regional and international co-operation

29. There was general recognition among the delegates of the need for co-operation at every level in the various areas of informatics as a means of developing it, contributing to the building of a new international economic order and furthering the cause of peaceful coexistence, differing only in respect of the forms and framework - and, in some cases, the substance - of such co-operation.

Experience in international co-operation

30. Several developed countries described the mainly bilateral but sometimes regional co-operation which had taken place. It was recognized that those activities, concerned mainly with training, standardization, exchanges of information, research and industry, did not cover the whole range of co-operation needs, particularly those relating to strategy and policies; telematics, data banks, maintenance, applications, and social and legal aspects. Various countries gave an account of their achievements with respect to networks and stated that they were prepared to give interested countries the benefit of their experience.

31. One regional organization and one country described the working of regional training centres for informatics.

32. In the course of the discussion of resolution 40, one delegate while recognizing the large measure of consensus achieved, wished to record the reservation of his government on a text which appeared to limit the possibilities of future arrangements for carrying out important co-operation programmes in the field of informatics and another delegate pointed out that for legal reasons his government would abstain in any vote on that resolution.

33. One Western European delegate declared that his government regarded all recommendations adopted at the SPIN Conference as being an important contribution to further consideration but, he pointed out, such recommendations had to be discussed very thoroughly and in detail before they could have any binding effects on his country.

Forms of co-operation

34. Certain developed countries considered that co-operation should take an essentially bilateral form and called for adequate infrastructures so as to enhance the endogenous capabilities of the countries likely to benefit from such co-operation. One developing country recommended that governments reinforce existing specialized national structures.

35. Certain countries regarded regional co-operation as a valuable complement to bilateral co-operation, particularly in respect of production and research. One regional organization, while advocating co-operation on a regional scale, doubted the efficacy of establishing regional centres.

36. Several delegates stressed the fact that co-operation must be objective, non-discriminatory and in the interests of all the parties concerned.

Framework for co-operation

37. The existing framework of international co-operation as undertaken by the institutions in the family of the United Nations suffered from an obvious lack of coherence and the absence of a concerted approach, which led to a dissipation of efforts, a waste of resources and, all in all, barely unsatisfactory results.

38. The position therefore required clarification, but divergent points of view were expressed. The setting up of a new institution, however, was ruled out by every country, with one exception. The delegate of one country stated that it should be understood that where some governments, members of IBI, had asked that recommendations be specifically addressed, or include reference to IBI, his country was not associated with such reference and would have preferred a general reference simply to appropriate international organizations.

39. Some countries emphasized the contribution made by IBI and wanted it strengthened, mainly by an increase in the number of its Member States - above all from among the developed countries.

40. One of the developing countries appealed to the Director-General of Unesco to raise the problem of co-operation in informatics at the next session of the General Assembly. Other countries expressed their opinion that Unesco was the most obvious and the most appropriate body to promote all co-operation action.

41. The delegate of another country stated that the interests of all countries, particularly the developing countries, could be served by reinforcing IBI's action. Unesco, therefore, should support IBI. In this respect it was pointed out by several delegations that IBI was an intergovernmental organization which devoted its efforts and its budget exclusively to informatics and it was suggested that IBI should be a truly universal organization in nature. It was recognized further that Unesco was an international organization which, since its creation, has acquired many years' experience in contributing to the formulation and implementation of scientific, technical and social programmes and it was recommended that Unesco, in co-operation with IBI, study ways and means of making IBI an effective instrument capable of contributing to the carrying out of the important co-operation programme which the development of informatics required.

Statements made during the debates by the Directors-General of Unesco and IBI

42. On several occasions during the discussion of items 7 and 10 the question was raised of the respective roles of Unesco and IBI in the different areas of informatics. Several speakers broached the matter of the nature of the relations existing between Unesco and IBI and those to be developed in the future. Each of the Directors-General also took the opportunity of giving details of the action his Organization intended to undertake and the ways and means whereby such action might be implemented.

43. In his statement, the Director-General of Unesco made the following points: "Unesco is an organization of the United Nations system and was created by virtue of the Charter that governs all the institutions of the United Nations system; it is a universal organization consisting at present, of 145 Member States, with programmes that are approved by all the Member States. Reports on their execution are submitted to the Member States. IBI is an intergovernmental organization which comprises, at the present time, 26 countries that are members of Unesco. [...] As an intergovernmental organization, IBI has a perfect right to devise and implement programmes, but the Member States of IBI should nevertheless not seek, by means of this Conference, to place a limited intergovernmental organization on the same footing as an international organization. With regard to the possible development of IBI and the role it plays in international co-operation between its Member States, there is no denying the fact that Unesco has furthered IBI's development since it was Unesco that instigated its establishment. Unesco, I repeat, is a member of the General Assembly of IBI on the same footing as the Member States of IBI. It is a member of the Executive Council of IBI on the same footing as the other members of the Executive Council; it is, thus, a full member of IBI. It therefore follows that, by its very nature, IBI cannot be regarded as an organization of the same kind as Unesco".

44. With regard to interdisciplinary studies on the social implications of the introduction or development of informatics structures, the Director-General stated: "Within the United Nations system, Unesco is the organization responsible for

both the social sciences and culture; it is therefore not concerned with the question of informatics per se: it studies the impact of science and technology on the culture and social development of different peoples. The scope of Unesco's activity in the social sciences and culture can be realized simply by examining the Organization's Medium-Term Plan or, again, its Programme and Budget for 1977-1978. Hence a straightforward reply can be given to the question raised by the Brazilian delegation: there is no intention of carrying out specific country-by-country studies - although in certain circumstances, as I shall explain in a minute, that could be done - but of undertaking a global study of the possible social and cultural impact of the development of informatics in different countries. From the economic point of view, Unesco could certainly not take action without calling on bodies outside the Organization, particularly other agencies of the United Nations system. Here, I should point out that Unesco does not regard itself as an isolated organization. As a part of the United Nations system, it seeks, every time its Member States entrust a task to it, the co-operation and collaboration of the other agencies of the United Nations system that deal with related matters or with matters forming the subject of a given recommendation, even if the recommendation itself, as I have said, is made within Unesco".

45. With regard to specific studies conducted in a given country, the Director-General pointed out that "Unesco can take action only at the explicit request of the Member States concerned. Such global studies would take account of the cultural and social differences that exist in the world and of the possible effects of informatics in different countries. Such studies would make it possible, in a way, to determine the impact of informatics on a given type of society. Secondly, if Member States specifically requested that studies be carried out on matters of direct concern to them, Unesco would carry out such studies with, of course, the assistance of national specialists and of specialists from other parts of the world".

46. Turning to the question of co-operation with the informatics community, the Director-General explained that: "Unesco cannot co-operate with every organization. The co-operation relationship between Unesco and the professional non-governmental organizations is established in accordance with conditions laid down by the General Conference of Unesco, and defines Unesco's obligations towards those non-governmental organizations as well as their obligations towards Unesco. The Director-General is empowered to admit non-governmental organizations to the category that we call 'C'. For categories 'B' and 'A', the decision rests with the Executive Board of Unesco and not with the Director-General himself. Moreover, the Executive Board and the General Conference define the conditions and the procedures whereby a working relationship may be established with any non-governmental organization. [...] As regards organizations with an established working relationship with Unesco, such as the International Federation for Information Processing, there is no difficulty. As far as any other organization is concerned, however, I must express the utmost reserve, because I shall be obliged to respect the rules laid down by the General Conference of Unesco and by the Executive Board".

47. "So far as co-ordination problems are concerned", said the Director-General, "there is a co-ordinating body within the United Nations system - the Inter-Organization Board for Information Systems and Related Activities that exists within the Administrative Committee on Co-ordination of the United Nations system. This Board, which was presided over by the head of the United States delegation at the time when he was Deputy Director-General of Unesco, deals with the co-ordination of all informatics programmes within the United Nations system. The problem is that IBI is not a member of the United Nations system and that a particular difficulty will arise regarding any possible co-ordination with IBI's programmes. That, however, is another matter and one that could be examined in the context, for example, of the co-operation that has taken place until now both between IBI and Unesco and between IBI and other agencies of the United Nations system".

48. During this discussion, the Director-General of IBI described his Organization's programme, including activities at the planning stage and those being implemented, and, in turn, referred more especially to the co-operation relationship between Unesco and IBI in regard to informatics in the following terms: "I should like to explain the way in which IBI is formally constituted, so that you may have an accurate picture of its status. IBI is an intergovernmental organization that was set up at the instigation of Unesco and has attained its present standing thanks to the constant support of its Member States and of Unesco; it has accomplished what I consider to be fruitful work, particularly in tasks - such as this present one - that it has carried out jointly with Unesco. I would point out that this Conference is a good example of what can be achieved by such co-operation between a mother organization and, so to speak, a daughter organization that is striving hard to take its place in the world and attain its majority, but without disavowing the blood ties that link it with its own family. Indeed, IBI's Convention contains unequivocal provisions in regard to its institutional association with Unesco. Unesco occupies a special position within IBI inasmuch as it participates in IBI's General Assembly and Executive Council - as Mr. M'Bow has said - on an equal footing with the Member States. I would go further: Unesco enjoys a privileged position even in relation to the Member States in that it is the only Permanent Member of the Executive Council. What is more, Unesco is privileged in relation to the Member States in that these rights stem directly from the Convention, which imposes, however, no obligations of any kind on Unesco in return for such rights - as it does on the Member States, which have an obligation to make a financial

contribution. And, finally, to round off this clarification of the special place occupied by Unesco within IBI, Unesco is privileged even in relation to the other Specialized Agencies of the United Nations in that it is the only one that participates within IBI in its own right. The IBI Convention contains two provisions that may go some way towards explaining the situation that has been presented by the Director-General. The first lays down that IBI shall observe a mutual co-operation agreement with Unesco. That agreement is in existence, having been signed in 1964, and provides for a co-operation framework that includes the transfer and exchange of personnel. Steps were taken last year to commence revision of the agreement so as to give a better definition, to a certain extent, of relations under that co-operation arrangement in order to reflect the present situation of informatics in the world. The IBI Convention also contains a provision stating that the Organization may maintain relations with the United Nations within the meaning of Article 57 of the Charter of the United Nations and in accordance with the procedures laid down in Article 63 of the Charter, and which, to a certain extent, relates to the comment made by the Director-General of Unesco concerning the possibility of IBI's becoming a Specialized Agency of the United Nations. At this point I should like to express my personal opinion concerning this matter in particular. I consider that, just as unripe fruit causes indigestion, it is premature to try to define here and now the future institutional form of IBI - even though the indications are set out in its own Convention - and could compromise its future development. I believe, therefore, that this question is one that does not arise today; the question that does arise is how to find ways in which - until such time as the right conditions exist or can be brought into being - IBI can work side by side in harmony with Unesco, serving the international community through Unesco where its own capacities do not enable it to act on its own. In other words, IBI can act as an executing agency of Unesco to enable the latter to carry out practical activities in those areas of informatics in which its own terms of reference might be restricted. That, then, is my point of view, and I believe that the statements made by the many delegates who have referred to the carrying out of activities by IBI jointly with Unesco should be interpreted as indicating that IBI - and this is, again, what I have more or less gathered from my conversations with the as yet small number of Member States IBI possesses - is seen by its Member States at this stage of its existence as an organization that could make a useful and practical contribution, in so far as its capacity allows, through close co-operation within Unesco's sphere of action. As for the suggestion that IBI should involve itself in certain activities, we are, of course, far from having adequate means and capacities as regards the area of social implications but, within IBI's limited resources, we have set up a committee of Member States that has made a specific study of this problem, and one of the reference documents you have before you entitled "Reflexiones sobre los impactos sociales de la informática" (Reflections on the social impact of informatics) contains some of the findings of that study. I must admit that it would be desirable to increase this capacity substantially, and IBI would be more than happy, within its limited competence, to co-operate with Unesco - possibly as one of the members of the committee Unesco might set up to study this matter.

Basic prerequisites for the effective use of informatics

(a) Manpower development

1. During the course of discussions various delegations described the efforts made in their countries to promote education and training in informatics. These efforts covered a large range of activities undertaken at various levels and conducted in different institutional frameworks. Considerable efforts had been made to introduce informatics education in university and high-school curricula, and certain initiatives were being taken to introduce informatics into secondary school curricula. These efforts were supported by in-service training of specialists and users and by development of syllabuses, teaching aids and practical methods elaborated for the purposes of local needs.

2. Within the framework of non-formal education to inform the general public of the social, cultural and economic impact of informatics, some countries gave special attention to preparing the public at large for the advent of the so-called "information age". Seminars, short-term courses, national and international meetings were being organized in order to exchange experiences among decision-makers. As a result, marked progress had been made in the elaboration of audio-visual tools and printed materials concerning informatics.

3. While outlining past efforts, some developing countries recognized the magnitude of the tasks ahead to bridge the technological gap as far as informatics was concerned.

4. There was unanimity of opinion among the delegates who addressed the meetings that education and training were of utmost importance and the lack of qualified personnel, both in quality and quantity, was a hindrance to the advancement of informatics both in developed and developing countries.

5. Therefore, it was considered that each country had to develop a national policy on education and training as an element of the national strategy for informatics in order to meet the needs and requirements in accordance with the conditions prevailing in each country. It was also the general feeling that the education of users, decision-makers and the general public was at least as important as the training of specialists. International organizations, such as Unesco and IBI, were invited by delegations to give more active support in this field.

6. The role of international co-operation in the form of bilateral, multilateral and regional programmes was emphasized by several speakers; the regional activities currently under way in Latin America, Africa, the Arab countries and among Eastern European countries, were mentioned by the delegates as examples to be followed. The importance of national efforts in training and and education was emphasized and certain delegates explained the way in which their training and educational problems were dealt with in their own countries, by the establishment of central training centres, institutes or bodies.

7. Dissatisfaction was expressed by some delegates on the training programmes of some universities in the field of informatics; graduates of those programmes did not meet requirements because of inadequacy in training, particularly in practical management applications. It was suggested therefore that such institutions should review their informatics curriculum so as to make it more application-oriented. Some delegates also emphasized the importance of an inter-disciplinary approach, especially in post-graduate studies, and pointed out that informatics is now also finding its way into the curricula of other disciplines. The need for practical, on-the-job training in addition to theoretical knowledge was also discussed in order to carry out, if possible, preparation in an environment with real life problems.

8. The delegates also stressed the importance of secondary schools in the overall policy of manpower training. This should definitely improve the public's awareness of informatics, especially in the developing countries. Some delegates mentioned the idea of introducing informatics elements at primary school level.

9. It was pointed out that training was seen as being more narrow and oriented to a specific objective which needed a shorter time, as compared with teaching (which was more broadly based and required a longer period). Delegates

who had witnessed the recent introduction of informatics stated that they had to have "crash" training programmes given by manufacturers, although they realized that these did not meet their countries' requirements. Some delegates mentioned the activities of private educational institutions, especially for training programmers, who were subsequently found to be not properly trained.

10. The Commission laid great stress on the fact that developing countries should not adopt directly the educational and training systems of the developed countries, and some delegates expressed the wish that developed countries take new interest in the education and training of personnel, such as setting up joint projects with the developing countries, especially for high-level staff. They also pointed out the financial difficulties and constraints for setting up institutions of higher learning in a large number of developing countries.

11. It was stressed by several delegations that in view of the rapidity of growth and change in the field of informatics, current knowledge very quickly became obsolete. Therefore many delegates referred to the importance of continuing education and suggested ways and means as to how this could be achieved by the provision of refresher courses, seminars, etc. Certain delegates pointed out that their countries had developed teaching material, packages and publications that were available for interested parties.

12. Many countries supported the proposal put forward by a member country for setting up an advanced International Centre of Informatics that would help educate teachers. At the same time, this Centre should be able to concentrate and disseminate international experiences in curricula planning and programmes, methodology for teaching and design of national policies for the training of personnel. In parallel, the desire was expressed to set up regional centres of informatics, and one delegate suggested that these institutions should be mobile.

13. Some delegates pointed out the particular importance of career structure for the development of informatics. Others also expressed concern about occupational profiles and expressed the wish to adopt international standards for diplomas. The role of well-structured education of different specialists was also seen as the means by which to avoid under-utilization of equipment in developing countries. Related to this, the importance of software training was also pointed out, and it was mentioned that systems analysis was seen as an important area where proper training was lacking.

14. While referring to assessment and acquisition of science and technology, it was acknowledged that informatics also had an important impact on engineering and technician education and that many countries were introducing informatics science in engineering and technician training curricula.

15. One delegation formally announced its country's decision to create a centre of a regional character for national training in co-operation with Unesco and IBI. The objectives and working programmes would be analysed at the Third Latin American Meeting of Informatics Authorities for which the date and agenda would be established by agreement with the national administration of the region. For this meeting invitations would be extended not only to those countries of the region but also to African and Asian countries, as well as other non-Latin nations of the whole American continent.

(b) Assessment and acquisition of technology; industrial capabilities and research and development

16. Many delegates once again emphasized the role of national agreements for the assessment and acquisition of technology and exchange of programme products. For transfer and acquisition of technology the importance of international agreements, regional co-operation and links among regions was mentioned by many delegates.

17. Attention was drawn to the fact that, for the development of indigenous industry, more vigorous research and development activities were needed and could be achieved by establishing specialized research and development institutes and by having a national research and development strategy. Some delegates expressed the wish to participate in the production of certain informatics equipment. To accomplish this, standardization of imported equipment was seen as one of the most important prerequisites in order to ensure compatibility between locally produced and imported elements. General procurement policy, including public sector co-ordination, had thus become necessary.

18. One delegate suggested the conclusion of contracts with manufacturers on a partnership basis for the transfer of technology, whereas another delegate mentioned that his country was concentrating on main-frame manufacturing.

19. Repeatedly, delegates from developing countries expressed concern about the monopoly of multinational companies in the informatics field. Some countries had to import this technology on the open market dominated by these companies, and these firms imposed their terms of contract, for example, with no possibility of negotiating. Some delegates felt that there was a need for control of the international market. Other delegates expressed the view that a better understanding of national markets was needed, that each country needed to formulate its own policies with respect to these commercial markets, and that there was no unfair domination of the market by multinational companies.

20. One delegate proposed that an international organization such as, for instance, IBI, be set up as a clearing-house between manufacturers and consumers. One delegate proposed that the Conference should adopt a resolution to change the situation, especially in order to regulate contractual matters and market conduct. He also added that the manufacturers should provide standardized documentation on their products. Some delegates felt that their countries were not always receiving corresponding value for their money.

21. One delegate said that not all the aspects of the industrial development of informatics were covered in the working document and that expert group meetings should be organized to look into this matter and to draw up technical criteria for an objective assessment of the utilization of equipment. Some delegates pointed out that the informatics industry could not be separated from electronics, telecommunications and automated systems; close links should also be established between research and industry in all these fields.

22. The Commission stressed the need for the adaptation of an informatics industry befitting local conditions and, to give an example, one delegate referred to Arabization in the utilization of informatics.

(c) Information concerning informatics

23. Delegates emphasized the importance of proper information in all aspects of informatics and the need to share this with other countries. Once again the role of informatics strategies and policies was stressed in relation to the acquisition and dissemination of information.

24. Information about other countries' strategies and policies in informatics was valuable and many delegates expressed the wish that international organizations such as Unesco and IBI should hold conferences for developing methodologies in these matters. The existing work of Unesco in science and technology policies in different regions and countries was explained and willingness was expressed to extend this work into the informatics area. IBI recalled that it carried out important activities in the field of strategies and policies in informatics, and that it was willing to make its expertise available to Member States.

25. Some delegates explained how information on informatics was disseminated in their own countries. Once again the role of education institutions and national centres was stressed and the importance of activities such as seminars, conferences and courses was discussed.

26. A proposal was received for setting up an international centre to serve for the exchange of information in all aspects of informatics such as available products, software packages and so on. Caution was expressed concerning the proliferation of regional centres and the fact of their having been established in fixed locations where there was already an existing substructure. There was, accordingly, a wish by several delegations for a rotation (mobile) system to serve areas where there were very few resources.

27. Information transfer was a complex mechanism to establish and operate. The roles of case studies, joint projects, international conferences, bilateral and multilateral arrangements and networks were discussed. One of the effective ways of information acquisition through attendance at international professional conferences in which the participation of developing countries should be encouraged and supported.

28. Information dissemination mechanisms already existing and operational in some developed countries were open and available for those developing countries interested in being linked with them.

29. One important aspect, that of language, was brought up by one delegate, in view of the fact that it was difficult at times to have access to existing documents which were in languages other than those currently used in the country.

30. Concern was expressed that not enough attention was given to the efficient use of informatics and that experience gained in other countries would be very valuable if this was easily accessible.

31. One delegate drew attention to the fact that the dissemination of information should not neglect the user community.

32. Another delegate expressed the view that means other than computers should also be considered, especially to reduce technological dependence.

33. Many delegates pointed out that documentation already existed in their own countries concerning various aspects of informatics policy and practice and that it could be obtained if so desired.

34. Finally, and in the light of the Commission's discussions, certain conclusions appeared to call for special attention:

the reinforcement or establishment of a national agency or body to co-ordinate and control the various informatics-related activities with informatics education in various ministerial departments. Various types of co-ordination among those departments involved in informatics education and training might also be considered;

the establishment, at national level, on the one hand, of a programme of action aimed at disseminating information concerning the different social, cultural and economic consequences of the introduction of informatics and, on the other hand, giving to secondary school teachers a basic training in informatics which would enable them to incorporate informatics education effectively into the disciplines taught in their schools;

the need for constant evaluation of the various sometimes still insufficient, curricula. These procedures have been introduced into informatics education and training in many Member States in order to develop and improve curricula and adapt them in order to complement other disciplines in educational institutions and programmes. Educational institutions with wide experience that already exist in various countries should play a leading role in this respect;

the drawing up and strengthening of interdisciplinary or inter-institutional arrangements bringing together scientists, educators, users and representatives of the general public, who are all concerned with informatics, in order to provide the responsible decision-makers with criteria and guidelines, thus enabling them to take into consideration all the social, economic and cultural consequences of the introduction of informatics in society;

the need to integrate the different forms of informatics education (education of the general public, specialists and different kinds of users) into national informatics strategies and policies, development plans and educational reforms. This implies that the various agencies and bodies responsible for planning and control of informatics activities at regional, national and local levels should give informatics education the necessary attention that it warrants as one essential element of the national culture;

the need to study questions related to examinations diplomas and certificates of professionals in informatics, to draw up comparable standards and to plan the country's manpower requirements in order to avoid unemployed trained informatics personnel;

the establishment of an appropriate manpower infrastructure in order to make available to society the necessary personnel with the required qualifications and appropriate experience. This implies that educational institutions should develop and train qualified manpower, at university, middle and vocational levels, and should concentrate not only on the scientific and technical aspects of informatics but also on those of a social, cultural and management character;

the need for international discussion to ensure control of the acquisition and transfer of technology know-how and programmes in view of the quasi-monopolistic nature of the manufacturers;

the importance of endogenous research and development, as well as industry, in support of national strategy and policy for the exploitation of informatics;

the strengthening of activities by international organizations such as Unesco and IBI in order to provide a much wider and more accessible network of information on all aspects of informatics. Concentration of efforts in an information exchange centre might well serve this purpose. It was also felt that Unesco and IBI should play a more active role in the development and exchange of national strategies and policies for informatics, help develop methodologies in this field, carry out case studies, organize conferences, and so on.

III. REPORT OF COMMISSION II

Applications of informatics

Areas of application

1. In the course of the Commission's working sessions many delegates gave a full picture of apolications developed in their countries, some very briefly and others in more detail. It was thus confirmed that informatics had already penetrated many areas of activity, whether in the form of scientific, administrative or non-numerical applications or in industrial processes. Although the range of applications referred to was very broad, certain constants could be identified. Three African countries, for example, reported that they used computers mainly for national financial management (treasury, public accounts, expenditure on equipment and staff...), in the management of the larger firms, and in banking. Three other developing States described more varied uses in other administrative sectors, but the emphasis was still mainly on management or production.

2. Certain countries which would have needed too much time to give a full picture of their applications chose to stress the global importance of informatics by supplying statistical data or describing one application which seemed to them likely to be of particular interest to the Commission.

3. An account was thus given of an information system on science and technology: the purpose of this system, operating under the authority of a State-controlled body, was to facilitate creative work in the scientific community, to ensure accurate planning and, finally, to ensure that the highest standards international were observed in respect of products, services and technology. One country has even set up a national "bank of ideas".

4. Another example concerned the use of computers by parliament: the importance of information in the preparation of political and legislative action was such that a new department had been introduced into that country's administrative structures; its activities covered three areas: the management of administrative activities, parliamentary work and legal documentation.

5. One delegate submitted a typology of applications with reference to the proposals set out in the working document. The different domains of science, medicine, technology, education and research were illustrated by many applications such as agriculture, meteorology, hydrology, libraries, scientific calculation and mathematical models. With respect to industrial processes, the reports made by States with a planned economy emphasized the importance of automation in this sector and the satisfactory results achieved in branches or sub-branches which play a key role in the economy, and the quality of the information system which could be developed on the basis of this infrastructure.

6. The use of informatics in administration and management was very widespread and was referred to by the majority of speakers. It was clear, in that context, that although the first stage referred to in the working document, which concerned the operational aspects of systems, had in the main been reached, the following stage of information synthesis for management and control had not been attained on anything like so wide a scale. Finally, many models for assistance in decision-making were described - one State expressed the wish for the support of international organizations on this point.

7. One delegate stated that the advanced applications of computerization constituted a field which exemplified more especially the problems raised by the transition to mass informatics.

Among such advanced applications the following were mentioned:

bureautics, aimed at increasing the productivity of office personnel, and particularly that of secretaries;

robotics, representing a developed form of industrial automation using the techniques of artificial intelligence;

computer-assisted design (CAD) in which the computer is used for the drawing up of plans and the graphic design of objects;

electronic mail;

the electronic transfer of funds, aimed at computerizing financial (bank/commerce/client) transactions;

computer-assisted instruction (CAI);

domestic informatics, either on-line or off-line, which brings computerization into the home.

8. One delegate stressed that the ways of approaching applications were of particular importance because it was not unusual to find

that the means deployed were greater than the results obtained. One industrialized country pointed out how necessary it was, whatever the characteristics of the computer system, whether it was primary processing equipment or a complex system, to ensure adequate planning, management structure and financing as well as the provision of competent staff at the very outset of the project.

9. Mention was made of the need to design informatics systems as logistic supports for information systems.

10. A number of States referred to the desirability of decentralization, following experience of excessively centralized computerization which led to operational difficulties. The new technological developments made it possible, either through the installation of inexpensive equipment or by teleprocessing, to adopt a different approach in future. Thus several delegates said that their countries were practising a systematic policy of decentralizing information at the level of the provinces. However, the advisability of decentralization was qualified since, in the view of another delegate, particular attention should be given to the geographical characteristics of a country before taking any decision. Moreover, there was frequently confusion between the decentralization of equipment and that of services. Decentralization was often advantageous because of the multiplication and improvement of the services provided; decisions concerning the decentralization of equipment should be made on the basis of a cost/benefit study.

11. Many States faced problems concerning the priority to be assigned in the choice of applications; that difficulty became all the more acute when those countries which did not have sufficient resources were confronted at the same time with problems that seemed more serious, or at any rate, more urgent. The choice of criteria to be adopted could only be a matter for each country to decide and varied with its specific conditions and its development options.

12. In most countries, according to a recognized procedure, priority was assigned to matters involving planning for economic development. At all events, mention was frequently made of the need to incorporate the plan for informatics in the national overall economic development plan.

13. Other States attached particular importance to applications of a social nature, and many delegations indicated their interest in this type of activity.

14. Many States emphasized the desirability of consolidating resources and setting up computer centres for collective use, thereby making the advantages of informatics available to medium-sized organizations and enterprises. Such centres might also, in given cases, provide methodological and educational aid.

15. In this same vein, several States stressed the important role of companies providing national computerized services. Such companies had great management flexibility, especially as regards staff salaries, and made it possible to cope with critical phases in the design and development of new projects in a manner consonant with national policies. They also made it possible to facilitate the transfer of technology.

16. The delegate of one international organization alluded to the three types of solution that should be considered before taking any decision - human, structural and technical. The application of informatics which constituted a solution of the third type, was not necessarily the most appropriate or the only one that might be adopted. Two examples were given of solutions, one of a human, and the other of a structural nature.

17. A balance should therefore be sought between the human, structural and technical factors.

Development of national capabilities in the utilization of informatics technologies

18. Many delegates stressed the fundamental importance of training in the creation of national capacity for using informatics, thereby echoing the ideas expressed in Commission I. Education and training in universities and research centres, with due regard for specific national conditions, were of great importance. One State mentioned the opportunities provided by a network of 21 minicomputers reserved for the development of common systems and for training purposes.

19. It was also reported by various States that research and development activities had been organized with a view to developing national capabilities in informatics, with particular emphasis on the economic and social aspects.

20. One State made the point that a decisive factor of particular importance to States - especially the developing countries - was the need to acquire sufficient technical competence to enable them to negotiate freely with the hardware suppliers. Such negotiation should be conducted in an equitable manner, and it should be possible to assess the equipment being offered in full knowledge of the facts.

21. To this end, many States recommended that the purchases made by the national administration of a country should be regulated so as to co-ordinate the selection of equipment, improve the country's negotiating position and plan the equipment-acquisition process. Such an approach would also have the advantage of reducing possible maintenance difficulties and risks of breakdown. Two delegates stressed the need for manufacturers to take account of the special conditions existing in tropical countries when designing and producing their equipment.

22. One industrialized country, which also engaged in manufacturing, spoke of the firm policy it invariably pursued in informatics, particularly with regard to the industrial aspect. Since in the final analysis, informatics consisted of technology and data, every State could make an effort to master the technology and control the data - and it would certainly be in its interest to do so. Such an ambition, which each State could gear to its own capabilities, might well be made into a deliberate policy. Several delegates, moreover, mentioned their participation in a common regional undertaking for equipment production.

23. Another country compared and contrasted voluntarist and non-voluntarist attitudes in the matter of national policy. In the one case, State intervention was limited to co-ordination, standardization and monitoring. The other policy, which was more complex, provided guarantees for the development of the informatics sector in the national economy and thus of national capacity to utilize informatics.

24. Various States affirmed the importance of co-ordinating software resources on a national scale. Libraries of national programmes had been established for that purpose and were available to users. New applications, therefore, should draw primarily on that software whenever possible, thus making for making savings and considerably shorter implementation periods.

25. Mention was also made of the importance of the role of technology in regard to national capabilities. One State announced the results of a policy of building and using mini-computers, which had proved satisfactory. In particular, the modest cost and the relative simplicity of the equipment produced and made it possible not only to satisfy the demand for standard applications in the fields of management and production but also extend the use of informatics to many other sectors, e.g. agriculture, statistics, education and sport. Another State drew attention to the significance of the phenomenon of "superfluous technology". Overequipment of unnecessarily rapid sophistication entailed major currency outlay and operating problems resulting from insufficient preparation.

26. Lastly, the need for norms and standards was emphasized by a number of States. It was a fact that differences in hardware and software constituted additional difficulties for use and training. Furthermore, incompatibilities represented a major obstacle for programme transfers and were therefore a source of additional cost.

27. With regard to this general problem of norms, which also concerned procedures and certain instances of data coding, one developed country thought that action should be taken by a competent intergovernmental body.

Informatics and socio-cultural development

28. Delegates stated that the nature of the implications of informatics for social development varied from one country to another and were determined by a number of factors. Several speakers stressed the importance of that impact and even, at times, its "alarming" character. Moreover, the higher the level of computerization in a country, the greater the extent of the impact on the man in the street.

29. New technologies, including those based on the use of silicon - and micro-processors in particular - had opened up a virtually unlimited potential in the field of products and services. This resulted not only in the development of new possibilities but also in a simultaneous and spectacular drop in cost, with consequent widespread extension of the use of informatics technology and its introduction into all sectors of daily life. Mention was made of the concept of "telematics".

30. Several States had set up, at the highest political level, panels to study the implications of the new technologies, and their deliberations had figured in information published through the mass communication media. These studies, which dealt with both short- and long-term aspects, were being carried out by specialists and representatives of the professions or organizations concerned, acting in close collaboration. Several challenges had been identified relating to different levels: political, social and individual.

31. At the political level, the delocalization of data and decisions had gone beyond the international division of labour and was creating a potential division of information. One delegate suggested that international action should be carried out in the legal domain. At the social level there was a certain contradiction between the need for frequent intervention on the part of the State and the concern to avoid the restrictive influence of government-by-computer. Finally, at the individual level, there was general agreement concerning the need to protect individuals. With regard to this point, the notion of "counter-power" was put forward, but it would appear more realistic to strive for the democratization of information.

32. Other States considered that the impact of informatics in the social domain depended, first of all, on its introduction into social areas in which it had not hitherto really penetrated: e.g. education, health, justice, etc. In this respect, the SPIN Conference could provide the developing countries with an opportunity to acquire knowledge of the applications developed elsewhere.

33. In this connection, it was necessary to take suitable precautions to minimize the possible adverse effects of the application of informatics. Two possible lines of action were to make those responsible aware of the risks involved and to alert the sections of the public concerned. In the long term there was no question, for example, of envisaging a society in which employment would be seriously threatened by excessive computerization; in the short term, however, taking account of the present structure and equilibrium of employment, certain jobs were at risk.

34. One State pointed to the lack of co-ordination between users and suggested that international co-operation in this area should be developed.

Transnational data flows

35. At the request of several delegations, and after consultation with the Steering Committee of the Conference, it was decided to include in the agenda of the Commission discussion on transnational data flows. Problems arising in connection with the transnational flow of data were extremely varied and complex, and had legal, social, economic and political implications which were dealt with extensively by the six delegates and two observers who spoke:

(i) At the legal level, there was the problem of co-ordinating the laws of different countries, otherwise veritable "data paradises" might be created in which the laws and regulations generally in force were circumvented;

(ii) At the social level, individual freedoms should be safeguarded; it should be made impossible to export illegality and care must be taken as regards the consequences that the possibilities provided by technology might have on the distribution of functions within multinational corporations;

(iii) At the economic level, particular attention must be given to the impact that data flows might have on balances of payments;

(iv) At the political level, the risk of dependence upon foreign countries was obvious.

36. One delegate gave the Commission two specific examples, one concerning services providing computer facilities (hardware and software) with pricing practices the effect of which was to discourage competition and private investments in that field, and the other illustrating the dependent State in which an industry might find itself if it relied on a transnational data network for controlling its production activities. Another delegate informed members of the Commission of the results of a study carried out in his country on transnational data flows, which showed in particular that the most sensitive data were generally transmitted by a simple carrier and that a clear distinction should be drawn between a transmission network which was merely a "container" and the data transmitted which were the "content".

37. Many European regional bodies were concerned with such problems and had included this subject in their programmes. As several delegates emphasized, international co-operation in this regard should be developed in order to bring the laws of different countries into line, exchange experiences and ensure a concerted approach.

IV. RECOMMENDATIONS OF THE CONFERENCE

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Present situation and future prospects of the use of informatics

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Recommendation No. 1

The Conference,

Meeting at Torremolinos (Spain) from 28 August to 6 September 1978,

Expresses its profound gratitude to His Majesty King Juan Carlos I of Spain for having honoured it by his presence at the opening meeting and for the support he thereby gave to the Conference;

Expresses its gratitude to the Spanish Government for all the facilities made available to the Conference, thanks to which it was able to carry out its work under satisfactory conditions;

Thanks the local authorities and the Spanish people for the warm hospitality shown to it and the expressions of goodwill it received.

Recommendation No. 2

The Conference,

Conscious of the importance of informatics in the development of all countries,

Noting the rapid pace of change within this field,

Recognizing the need for governments to monitor this development,

Stressing the fact that the computerization of a society, in addition to its desired primary effects, may also have negative secondary effects,

Reaffirming the need to build national capabilities for assessment, selection, adaptation and indigenous development in the area of informatics,

Recommends that:

1. Governments, when planning and regulating the introduction of automated information systems in administration, education and production, should take into account all the wide social, economic, human and political effects of these far-reaching changes in styles of work and life and attempt to forecast these expected changes so as better to serve the objectives of national economic, social and cultural development of the country;

2. Governments should be aware of the difficulties and complexities in estimating the true overall costs in monetary and human terms of introducing, maintaining and updating computing systems and take into consideration the necessary efforts and costs incurred by changes in organization and by increased demands on the suppliers of input;

3. Governments should be aware of the needs for appropriate safeguards due to the vulnerability of complex information systems to errors, criminal action, physical hazards, etc.;

4. Governments should ensure that all persons have the legal right, to the fullest extent possible, to be informed about recorded personal data concerning themselves and to have the possibility of getting errors corrected;

5. Governments should recognize that all computer systems should be designed from the outset so as to take into account the possibility of human errors and should have procedures for swift and easy correction of such errors;

6. Governments should be guided by the principle that those groups of people who will finally be directly involved with the computer systems in their work, should be consulted in defining the specifications of the systems and that those affected by the computer systems should have their own needs properly considered;

7. Governments should take into account the national employment structure when computer systems are introduced and should not expect that such systems always reduce the need for personnel or training but often require increased and special training of the immediate users as well as the public concerned.

Recommendation No. 3

The Conference,

Aware of the importance of the impact of informatics on society,

Invites Unesco, in collaboration with IBI, to carry out and encourage multidisciplinary studies and forecasts on the social and cultural implications of the introduction or development of informatics-based structures in countries that present different patterns of social, cultural and economic development.

Recommendation No. 4

The Conference,

Considering the views expressed by several delegations during the discussions,

Recommends that:

1. The widest possible exchange of information on the experiences of Member States of Unesco and IBI in introducing and developing their national policies on informatics be carried out so as to enable their governments to profit from such experiences and to acquire relevant information which can be put to use in developing their own policies and strategies;

2. Producers of hardware and software in the field of informatics be encouraged to take greater account of the specific needs of the final users of such technology, in particular of those of developing countries, bearing in mind specifically their points of view in respect to the economic, social and cultural consequences of the introduction and development of informatics in their countries;

3. The Directors-General of Unesco and IBI adopt the necessary measures for such exchanges of views to be carried out in a systematic way and in a manner more profitable for the harmonious progress of mankind as a whole, in accordance with the general objective of establishing a more equitable international world order.

Recommendation No. 5

The Conference,

In view of the fact that the developing countries are undergoing what may be regarded as unprecedentedly rapid development in the field of informatics;

Considering that copying the experiences of the developed countries, without adapting them, will not necessarily produce the desired results,

Recognizing the importance of the role of informatics in national development plans, the relationship informatics bears to social, economic and cultural activities and the need to ensure its overall efficiency,

Reaffirming the role to be played by a central, national body in the elaboration of national informatics policy for achieving the desired beneficial results,

Recommends to the different countries that they recognize the necessity for a national informatics policy in each country with a view to introducing a comprehensive strategy which should be planned with regard to:

the definition of application priorities;

the elaboration of a policy governing action to be taken in the matter of acquiring informatics;

the drawing up of programmes for training technical and administrative specialists;

the formulation of a coherent studies and research policy;

the setting up of a national informatics industry for both software and hardware;

Recommends to the international organizations that they provide the necessary assistance to Member States who so request in the matter of formulating national informatics policies to fit in with the States' own science and technology policies, and in regard to the setting up of national bodies to be responsible for defining and carrying out informatics policies and strategies.

Recommendation No. 6

The Conference,

In view of the important role played by technology transfer in spreading informatics throughout the world and the fact that this process will continue in the future,

Considering the prevailing situation in transactions with developing countries aspiring to exploit the potentialities of informatics in accelerating and rationalizing their development efforts,

Realizing the decisive role that the international organizations could play in the achievement of optimum benefits of modern technologies in various social, economic and cultural conditions,

In the light of the efforts presently exerted at the international level to rationalize and draw up international rules of conduct in this field,

Confirming the responsibility of national bodies sponsoring informatics and its development for enhancing indigenous capabilities in order to achieve maximum effectiveness of informatics in development,

1. Calls upon the international agencies concerned to encourage the establishment of international standards in software so that it may be of a general nature and independent of any specific manufacturer and/or equipment;

2. Calls upon the national bodies responsible for informatics development to see to it that the suppliers of hardware and software take full account of the prevailing conditions in the importing countries and undertake their adaptation and conditioning to suit the cultural, social, economic, and environmental conditions of these countries and particularly those of the developing countries;

3. Calls upon the international organizations concerned to accelerate their work in drafting an international code of conduct on technology transfer, and on national bodies seriously to implement this code especially with respect to maintenance and support services related to the sale of hardware and software, lessening the reliance of their respective countries on sources outside their regions in the fields of qualified manpower, spare parts, and other materials;

4. Calls upon the national bodies to engage in policies designed to promote beneficial competition among the limited number of suppliers and to require regularly updated price lists.

Recommendation No. 7

The Conference,

Realizing that informatics, because it has its roots in all disciplines, is an essential tool for the devising and implementation of original strategies specially designed to speed up the process of development,

Convinced that any dependence in the realm of informatics could give rise to a host of servitudes which could place the attributes of national sovereignty in jeopardy,

Anxious to contribute to the advent of a new international order (in the economic, social and cultural spheres) which is desired by all the peoples of the world,

Anxious to encourage the dissemination of scientific and technological information and to promote the exchange of experience in respect of applications and equipment,

Aware of the commercial practices of certain transnational corporations which operate to the disadvantage of developing countries,

Conscious on the one hand of the need for suitable training and education for all countries in informatics and on the other hand of the overwhelming needs and the paucity of the resources of the countries of the Third World,

Recommends that Unesco, in close collaboration with the Commission on Transnational Corporations and the United Nations Centre on Transnational Corporations, introduce a programme to strengthen the negotiating position of all countries, and particularly of developing countries, with regard to transnational corporations;

Recommends that Unesco promote the establishment of co-operation structures at the regional and international levels designed to serve as a framework for a concerted approach to the exchange of scientific and technological experience and information.

Recommendation No. 8

The Conference,

Considering that the successful use of informatics depends mainly on efficient organization,

Recommends that all governments reserve a special place for the teaching of organization sciences.

Recommendation No. 9

The Conference,

Aware of the need to make better use of national capacities in the formulation and implementation of national plans for informatics,

Recommends that governments, and particularly those of the developing countries, create and encourage national service and consultancy bodies as a means of developing and increasing their countries' technical potential for software production, applications, optimal use of resources and vocational training.

Recommendation No. 10

The Conference,

Aware of the need for readily accessible up-to-date scientific and technological information,

Recommends:

that countries that have developed substantial data base capabilities should provide in their programmes for the use of scientific and technological information resources by all interested countries;

that international agreements should be established on the rights of States in respect of transborder data flows, providing for the protection of information held by governments, private institutions and individuals.

Recommendation No. 11

The Conference,

Recognizing the importance of making the general public aware of both the positive and negative aspects of informatics, and of providing citizens with basic knowledge about this subject so that they may be able to understand and use its resources to the best advantage, thereby facilitating their adaptation to life in a society using informatics-based systems, which countries will increasingly need in order to speed up their development plans,

Recommends that governments, through their respective education authorities, include in their educational planning, from primary school upward and at all levels of education, those topics related to informatics which may be considered appropriate, both qualitatively and quantitatively, in order to give the general public adequate knowledge of this subject, thereby enabling people to understand and utilize this tool in a manner consonant with national development plans.

Recommendation No. 12

The Conference,

Calls on Unesco and IBI to take all practicable steps to promote, and to provide the necessary financial, organizational and methodological assistance for the setting up of regional centres for the training and further training of informatics specialists.

Recommendation No. 13

Training of personnel

The Conference,

Bearing in mind the seriousness of the shortage of adequately trained personnel in the various branches of informatics in the developing countries,

Invites Unesco, the other organizations of the United Nations system concerned with informatics and IBI to study the feasibility and costs of establishing a centre to train teachers in the various branches of informatics; this centre would be responsible for training teachers of a high level in these disciplines, for analysing and recommending the best methods for such teaching and, on the basis of the stock of international experience, for studying the best types of policies and strategies for specialist training with a view to advising the different countries on the formulation of such policies and strategies in line with their own particular circumstances;

Also invites the above-mentioned international organizations to encourage the establishment of regional centres for the training and retraining of specialists.

Recommendation No. 14

The Conference,

1. Recognizing the importance of education in the field of informatics, as a condition for a complete transfer of technology without drastically undermining national values,

2. Realizing that the important work being done by IBI in all Member States would be facilitated if its operations were decentralized by means of regional offices established in places equidistant from those countries which, by virtue of their culture, language, bonds of economic co-operation and relative geographical proximity constitute groups for potential integration,

Recommends that the feasibility be investigated of a regional office in Latin America for education, research and the adaptation of both endogenous computer technologies and those external to the region, particularly in order to meet the needs of the Latin American countries by promoting the development of computer technology at the local level in accordance with the economic integration plans of the countries of the region.

Recommendation No. 15

The Conference,

Considering that one of the needs most acutely felt by countries, and more especially by the developing countries, is the need for qualified staff and competent teachers in order to obtain the full output expected of automatic data processing systems, and

Bearing in mind that the solution to this problem calls for intensive international co-operation to facilitate the exchange of experience,

Expresses its earnest hope that the competent international bodies will intensify international action in this field by promoting educational and scientific co-operation aimed at achieving concrete results. In this regard, the Conference takes note of and welcomes the Spanish approach, as reflected in the close and constant collaboration of the Spanish Government with the IBI Regional Centre for Education in Informatics (CREI), the main purpose of which is to give greater weight to the membership of the fellow peoples of Ibero-America in the aforesaid body and in its programme of activities.

Recommendation No. 16

The Conference,

Considering that progress in informatics in the developing countries calls for the training of both specialists and users,

Considering the limited means available in the developing countries for the setting up of suitable national structures for training and research in informatics,

Considering the need to keep trained specialists and research workers in their countries and to provide them with training in accordance with the environment where they are to work,

Recommends, in regard to training and research, that the international organizations concerned:

1. Assign priority to promoting the establishment of regional training and research institutions in the developing countries and designed to serve their needs, in order to:

   (a) train high-level specialists in informatics and research workers;

(b) encourage research in informatics in fields involving certain problems common to the developing countries;

(c) promote educational methods for the teaching of informatics;

(d) set up mobile teams to provide training and refresher courses to computer specialists and users by means of short- and medium-length courses, more particularly in countries which have no national training institutions;

2. Provide assistance to training and research bodies - both existing and yet to be established - in the developing countries, by making available to them the most appropriate resources.

Recommendation No. 17

The Conference,

Considering the availability of appropriate manpower is an essential prerequisite for the effective use of informatics,

That apart from the training of professional users of informatics, a general information culture on informatics among all types of citizens who, directly or indirectly, will be affected by its applications in a modern society, is essential to the promotion of the effective use of informatics,

That the professional training and the general information programmes envisaged should serve to make the use of informatics contribute more effectively to the attainment of the national economic, social and cultural goals of the countries concerned,

That in many countries, due to lack of adequate quantitative and qualitative information, and especially in view of the difficulty of access to relevant information, for various reasons, governments are unable to establish, or experience serious difficulties in establishing, national priorities and programmes on professional and permanent education on informatics,

Recommends that:

1. Governments of member countries, particularly those of developing countries, should adopt early measures to ascertain their needs in the information required for the evaluation of their countries' requirements, for the training of personnel at all levels for the utilization of existing informatics equipment and software, for the setting up of projects for new uses of informatics, including the development of new hardware and software more suited to local conditions and for the diffusion of a general informatics culture in their countries;

2. Governments of member countries should make efforts to exchange experiences and information acquired in ascertaining their needs and in meeting them; special consideration should be given to the exchange of experiences and information among countries at similar stages of informatics development or situated in homogeneous regions;

3. Additional efforts should be made to develop compatible systems of evaluation particularly among developing countries, with due attention being given to the need for establishing norms, standards and classification of hardware and software in such a way as to facilitate comparisons and exchange of experiences and information; Unesco and IBI, continuing and strengthening their traditional co-operation while encouraging a clear and distinct division of work, should be called upon to participate in such additional efforts; these efforts should take into particular account the non-homogeneous nature of present-day societies, and should take into account the varying degrees of needs and problems and the varying types of solutions which must be developed in order to meet the rich diversification of situations in the world;

4. Governments of member countries should encourage and help original thinking in meeting the challenge of computerization in their societies, with a view to diminishing the pitfalls which might result from the importation of techniques developed for and aimed at distinct economic, social and cultural situations; this might involve the design of new equipment, new ways of utilizing present equipment and the manner and extent of introducing informatics systems to new situations.

Recommendation No. 18

The Conference,

Considering the fact that informatics now impinges upon all human activities; the results of data processing concerning not only computer specialists and managers but also a large section of the public, if only because documents of all kinds and on all subjects are now printed out by computers,

Considering the importance of using the characters traditionally utilized to transcribe the national language, and the influence which this might have on the development of informatics and the generalization of its use,

Considering the importance of unifying systems in all countries which use the same characters - such as, for example, the Arabic characters used in the Arab countries and in countries outside the Arab world, which have a combined population of several hundred million - in view of the possibilities for the exchange of information which might thereby be created and of the greater return on investment which would result from increasing the size of markets,

Bearing in mind the possibilities which exist in the countries in question for creating an industry based on computer material using these characters,

Recommends:

that all necessary measures be taken by international bodies such as Unesco and IBI and regional bodies such as ALECSO to define a frame of reference for the co-ordination of work done in the countries concerned in order to achieve, in the very near future:

the unification of codes; and

standardization of computer equipment and in particular of input/output equipment;

that an urgent appeal should be made to the countries using Arabic characters, inviting them to associate themselves with this action.

Recommendation No. 19

The Conference,

Considering that the existence of qualified personnel of all levels is an essential condition for the introduction and effective use of informatics,

Conscious of the decisive role that should be played by international co-operation in the implementation of national or regional plans for the training of informatics specialists and users,

Considering that the Institut africain d'informatique (IAI) (African Informatics Institute) in Libreville represents a regional training institute set up in 1971 by 11 African Member States of Unesco and IBI with a view to providing a collective solution to their substantial training needs,

Conscious of the considerable technical, manpower and financial resources required for the permanent installation and efficient operation of the IAI,

Recommends that Unesco and IBI recognize the Institut africain d'informatique in Libreville as one of the regional institutions existing in Africa for the theoretical and practical training of informatics specialists and users;

Invites Unesco and IBI to devise and implement a programme of technical and financial co-operation in support of the Institut africain d'informatique so as to enable it to achieve its objectives as effectively as possible.

Recommendation No. 20

The Conference,

In view of the increasing importance of the human element in the development, dissemination and proper use of informatics,

Realizing the new requirements dictated by informatics in manpower development,

Taking into consideration the prevailing situation in many parts of the world as regards the opportunities for education, training and development of public awareness whether at the national, regional or international levels,

Emphasizing the role of States and international and regional organizations in improving and developing present capabilities and facilities in regard to education, training and the development of public awareness,

Calls upon States:

1. To give attention to the drafting of an integrated plan for manpower development in informatics, so as to include the training of specialists, users and decision-makers and the promotion of public awareness. The plan should take into account the role of formal and informal education as well as that of the mass media;

2. To enlarge the scope of manpower development in informatics so as to include all levels of activities in informatics from management to operation;

3. To enhance the awareness of those reponsible for implementing national plans in informatics of the importance of social, cultural, economic and administrative considerations in informatics;

Calls upon

the scientific and educational organizations, both national and regional,

to co-operate amongst themselves and with international organizations in organizing training courses, seminars and post-graduate studies in regional groups having similar cultural and development backgrounds;

the Director-General of Unesco and the Director-General of IBI,

to assist States and regional organizations in manpower development and the promotion of public awareness in informatics at the various levels (specialists, technicians, the general public), by means of training courses, specialized higher studies, the preparation of scientific and information material and the provision of lecturers and trainers.

Recommendation No. 21

The Conference,

Recognizing the special importance of giving impetus to the development of informatics in all nations, and particularly in developing nations, by exchanging experience and publicizing the advances made in the various technical, organizational and management aspects of informatics,

Aware that seminars, conferences and congresses make it possible not only to encourage the exchange of experience and knowledge but also to ensure closer links of friendship between countries through the personal contacts of specialists with similar interests,

Bearing in mind that the success of such events depends not only on the importance of the subjects dealt with but also on the active participation of a large number of countries representing all cultures and levels of technological development,

Recommends:

1. That Unesco and other international organizations encourage and support the organization of conferences, seminars, congresses and other similar events for the analysis and dissemination of all aspects of informatics, dealing both with technical progress in this field and with improvements in the organization and management of informatics;

2. That these events be organized in different countries, both developing and industrialized countries, in order to make opportunities for large-scale attendance available among the different regions;

3. That Unesco and other international bodies prepare and finance plans for technical and economic assistance in order to enable a greater number of nations to be represented at these events.

Recommendation No. 22

The Conference,

Considering that planning for the development of informatics constitutes a problem common to all countries,

Bearing in mind the fact that planning methods in this field, characterized by rapid evolution and many and varied interactions, warrant improvement,

Aware of the desirability of continuing international discussion about planning methods in informatics,

Recommends that Unesco and IBI strengthen their co-operation in developing methods for the devising of master plans in informatics, the aim of which would be the preparation of a methodological guide for planning in informatics at the State level.

Recommendation No. 23

The Conference,

Recognizing that there is an acute shortage of trained manpower in all areas and at all levels of informatics development,

Further recognizing that the developing countries do not as yet have the necessary resources for their development,

Also recognizing that regional co-operation amongst nations can optimize the use of scarce resources for manpower development, and that in the final analysis it is manpower which will determine the success or otherwise of the use of informatics in developing countries,

Calls upon Unesco and IBI to support, depending on their financial resources, and promote in every possible way the granting of assistance to the regional educational centres for the development of informatics financed by an appropriate international organization, such as Unesco, and subsequently expanded to subregional centres, for example in the Asian region.

Recommendation No. 24

The Conference,

Aware of the importance of suitable training for personnel working in informatics,

Suggests defining ways and means that would make it possible to set up a national fund in the developing countries for the establishment of training centres specializing in informatics, in accordance with the specific needs of each country. In those countries which already have specialized training centres, or which provide education and training in their institutions of higher learning, the fund might be used to further such programmes by improving their equipment and extending it to applied research programmes concerning the possibilities for the development of informatics;

Recommends the establishment of a free exchange of experience between the various countries, through Unesco and IBI, in matters concerning the development of programmes for the education, training and qualification of staff specializing in informatics.

Recommendation No. 25

The Conference,

Considering the strategic importance of information and of the action carried out by States and international organizations with a view to setting up data banks covering every field,

Noting that, in a number of countries, legal provisions relating to the protection of the rights of the individual have been elaborated or are in the course of elaboration,

Having regard to the concern expressed by some countries that information concerning them is contained in data banks outside their territories,

Recommends to Unesco and IBI that they examine the necessary ways and means of organizing and achieving the transnational transfer of information, taking into account the consideration already being given to these issues within particular countries and by international fora.

Recommendation No. 26

The Conference,

Bearing in mind how important it is for countries to be able to refer to clearly defined applications in order to make use of the opportunities offered by computer technology and systems which have been installed,

Suggests that Unesco and IBI study and propose practical and realistic methods and the most suitable file structures so that the shared use of data banks may be both feasible and economic,

Also suggests that a strategy be studied and proposed which, taking as its point of departure the advent of the micro-processor, will enable developing countries to take part in the manufacture of "intelligent" components which will bring about radical changes in industrial processes; which will make it possible to optimize the use of computing equipment and terminals which have already been installed and assist in the establishment of data transmission networks.

Recommendation No. 27

The Conference,

Bearing in mind the efforts that have been made by Unesco and IBI in the field of informatics, as well as the success achieved through SPIN 78 which has made it possible to bring about a specific awareness in the international community regarding the need for national policies and strategies in this field,

Agreeing with the statements made by the delegations in plenary meeting and in Commission I regarding national experiences, and considering that the objective of making countries realize the extreme importance of informatics for the economic, social and cultural development of peoples has been achieved,

Believing that it is essential for Unesco and IBI, within their fields of competence and in accordance with their respective terms of reference, to provide practical assistance for the future elaboration of policies and strategies in the field of informatics in countries which so request,

Considering that the bodies sponsoring SPIN 78 should strengthen their programmes in order to make them relevant to the new international order in informatics, with the aim of producing individual technical studies by countries, especially those which are at the stage of drawing up their national policies and strategies,

Recommends that Unesco and IBI, in their respective programmes, place special emphasis on studies and individual attention to countries as regards:

(a) plans for the acquisition by the public sector of computer equipment and methods for its optimum utilization;

(b) due attention to the human factor, through adequate training programmes;

(c) in co-operation with the International Telecommunication Union, bringing the use of technology into line with the international regulations governing the use of telecommunications at the international level, in order to give suitable impetus to the use of tele-informatics.

Recommendation No. 28

The Conference,

Considering that the development of informatics is largely conditioned by its present and potential applications in the most developed areas of the world,

Recognizing that this has undesirable consequences on the utilization of informatics in less developed countries, resulting particularly from:

(a) the spreading of technologies inadequate to local needs, sometimes over-sophisticated, sometimes close to obsolence;

(b) the high economic costs of introducing equipment and techniques far in excess of, or not compatible with, local needs or local capacity to handle them;

(c) the high social costs of such unwanted consequences in terms of the level of employment and the preservation of local cultural values and mores;

Bearing in mind that it is to the advantage of all countries that world-wide progress in informatics should lead to better mutual understanding among nations and to expanded co-operation among countries,

Recommends that:

1. Governments should encourage scientific and technical research in the field of informatics, in the offical and private sectors, for the purpose of identifying the areas of application most suitable to local needs and the type of systems most appropriate for use in such areas, taking into consideration local economic, social and cultural conditions;

2. Governments should encourage the more rational use of local informatics capacity in hardware, software and services; particular attention should be given to making idle capacity available to new users and to expanding the general capacity of the informatics systems of the country by encouraging and facilitating their compatibility and integration; efforts should also be encouraged for local users to develop new software solutions as alternatives to investments in new hardware;

3. Governments should also encourage public participation in the choices of new possible applications of informatics, seeing to it that proper clarification on the purposes and possible consequences of new uses be provided to the sector of the population concerned; in addition, they should monitor the results of the new applications with a view to appraising their effectiveness and economic, social and cultural impacts on the sectors of the population concerned.

Recommendation No. 29

The Conference,

Having as its basic objective the exchange of experiences in informatics policies and strategies,

Being aware of the situation as regards their applications in different countries, particularly the difficulties involved in such applications in the developing countries,

Realizing the wide range of applications that have been developed by different countries,

Recommends that Unesco, IBI and other international organizations study the feasibility and advantages of the following:

(a) that they propose the creation of an international fund of projects and programmes of general application that could be used by various countries;

(b) that they urge countries to take an active part in the work of ISO to bring about standardization in the field of informatics.

Recommendation No. 30

The Conference,

Affirming the necessity of benefiting as early as possible from the potentialities of informatics in the field of development,

Conscious of the nature of the structure of information required for national planning,

Recommends that:

1. States should collect comprehensive statistical data on the existing organs of informatics and on available capabilities so as to develop application programmes and to rationalize effective use of informatics technology;

2. In the case of applications that require substantial investments, States should consider application priorities in the light of available resources and the short-term and long-term objectives of the national development plans. States, especially the developing countries, should carry out these applications progressively and should effect cost-efficiency analysis before embarking upon them;

3. Consideration should be given to the general impact of the application of informatics on society, and measures should be taken to ensure sound design and execution; appropriate steps should also be taken to achieve maximum co-operation and understanding at the social level.

Recommendation No. 31

The Conference,

Considering the importance of telecommunications for the effective application of strategies in informatics,

Aware of the importance of reliable and high-quality telecommunication services for the effective application of strategies in informatics and computer systems,

Recommends that governments, in devising strategies for the introduction of computerized information systems, give due consideration to the development of their telecommunication services and networks for the effective attainment of their objectives in informatics; and

Invites the International Telecommunication Union to undertake relevant action with Member States in this regard.

Recommendation No. 32

The Conference,

Convinced that the development of transborder data flows is one of the most important questions raised by the development of informatics in international relations,

Considering the threat of evasion of national laws posed by these flows, particularly for countries which have passed legislation on informatics and freedoms,

Considering present disequilibria in the direction of these flows which could place national sovereignty in jeopardy if the confidential nature of certain data relating to States and business enterprises, as well as of information regarding the private lives of individuals, were not respected as a result of such delocalization of data,

Considering the economic repercussions of these flows, particularly on the balance of payments,

Recommends broadly based concerted efforts at the international level to examine problems shared by the different nations, efforts which, in the light of what is at stake, should concentrate on:

1. Distinguishing between questions relating to the data flows themselves and those relating to the means of transmission;

2. Defining the conditions of compatibility between the principle of the free flow of information and the necessary regulations;

3. Considering the political, economic, social and legal dimensions of the problem of data flows without seeking to reduce them, in a single international instrument, to only one of such aspects;

4. Taking into account the special circumstances of the different regions and the state of advancement of thinking in the various geographical zones. Advantage should be taken inter alia of the work already done by EEC, the Council of Europe and OECD.

Recommendation No. 33

The Conference,

1. Stressing the importance of international co-operation in the scientific and technological community in the various disciplines of informatics, and

2. Taking into account the role played by Unesco in the past in the creation of scientific and technical unions and associations, both international and regional in the field of informatics,

Recommends:

that Unesco should expand its programmes to strengthen the role played by specialists from developing countries to increase their participation in and contribution to international scientific and technological co-operation;

that, wherever feasible, Unesco should provide encouragement and support to the activities of the International Federation for Informatics Processing and other international non-governmental organizations, by:

organizing in-country seminars and meetings in co-operation with local groups;

supporting attendance by delegates from developing countries to technical meetings, both international and regional;

supporting attendance at organizational meetings to stimulate and shape additional activities useful to the developing countries;

supporting attendance by computer experts to work with local groups in organizing educational programmes meeting local requirements.

Recommendation No. 34

The Conference,

Recognizing the many problems facing all countries in seeking to fulfil the objective of building independent national capability which can apply informatics technology effectively,

Considers that there is no alternative to knowledge and understanding of the technology for building such a capability. The prime objective is the development of education and training facilities in all aspects of informatics technology and use so that personnel in sufficient numbers, trained to the necessary high standards, become available at the time they are required,

Believing that by providing support in these areas countries with experience and expertise in informatics can most usefully render assistance to those countries which need the ability to select and evaluate the products and systems which best meet their particular requirements,

Recommends that:

1. Priority be given by all countries to the development of appropriate education and training facilities at all levels. As an essential prerequisite for independent informatics capability these facilities must provide personnel in the numbers, and with the skills required, that will best serve the national interest;

2. Bilateral arrangements between countries be encouraged for the sharing of techniques, resources and information relating to education and training;

3. The appropriate international and intergovernmental organizations, such as Unesco and IBI, play an active role in facilitating contacts between countries in close co-operation with relevant professional bodies.

Recommendation No. 35

The Conference,

In view of the rapid development of informatics in the modern world,

Considering that Unesco has a special duty to synthesize the experience of the various countries and trends in the development of science and technology, with a view to bringing this knowledge to the notice of all Member States, and of the developing countries in particular,

Invites the Director-General of Unesco to set up, within the framework of Unesco, and with the collaboration of IBI, an advisory group of experts to study and prepare practical proposals on present problems in informatics, including current trends in the development of informatics, machinery for the scientific forecasting of the development of informatics and the future establishment of a world software bank.

Recommendation No. 36

The Conference,

Considering that international standardization in the field of informatics is of particular importance for Member States,

Recognizing that the achievement of international standardization could considerably reduce Member States' expenditure on informatics,

Taking account of the fact that standardization in the field of informatics could be a powerful stimulus to international co-operation in the interests of peace and mutual understanding between peoples,

Invites the Director-General of Unesco, when possible and in collaboration with the International Organization for Standardization, to convene a preliminary meeting of experts on the elaboration of international standards in informatics.

Recommendation No. 37

The Conference,

Considering that the utmost development of international co-operation in accordance with the principles of equity and mutual advantage is exceptionally important for the effective use and dissemination of the major achievements of informatics throughout the world and especially in developing countries,

Recommends to Unesco and IBI, in this connection, that they make every effort to promote the abolition of discriminatory restrictions, for political or other motives, in the exchange of scientific and technical documentation and the sale of computer hardware and software.

Recommendation No. 38

The Conference,

Realizing the importance of informatics as a useful tool for development,

Recognizing the necessity for trained manpower in the effective use and maintenance of this tool,

Aware of the fact that this tool has been acquired to a certain extent by developing countries either by rental, lease or purchase without sufficiently trained manpower in their acquisition and use, leading to unfavourable rental, lease or purchase terms for the developing nations and thereby resulting in under-utilization and wastage of developing nations' scarce resources,

Recommends, therefore, that, as appropriate, international and intergovernmental organizations, such as Unesco and IBI, governments of developed countries and private organizations, especially those which market informatics equipment in developing countries, be urged to accept, as part of their responsibilities, that they:

1. Establish training facilities and provide teachers of informatics in co-operation with developing countries;

2. Make available to nationals of developing countries avenues of training at higher levels elsewhere at reasonable costs;

3. Provide international standard documents, as needs may arise on such issues as contractual and acquisitional terms, codes of marketing conduct, etc. binding on both parties while the contract remains in existence;

4. Make regularly available to developing countries, information material on progress in the field of informatics, including changing prices and policies;

5. Provide a regular reference catalogue on sources of consultancy in informatics for developing countries;

6. Take immediate steps to encourage regional co-operation between developing countries in the fields of informatics especially in applications and maintenance of equipment;

7. Inform governments - especially those of developing countries - of the problems that may exist and be discovered in the applications of informatics.

Recommendation No. 39

The Conference,

Considering that scientific, technical, economic and cultural information has an increasingly important place in national development,

Noting that one tenth of the world's population holds at its disposal in computerized data banks 95 per cent of the world's technical, cultural, scientific and economic information,

Aware that this situation could further widen the gap between the developed and the developing world,

Requests the General Conference of Unesco to reinforce such means as already exist within Unesco for the purpose of assisting developing countries to obtain access to information located in national and international data banks in the more advanced countries and to disseminate their own information;

Recommendation No. 40

The Conference,

1. Considering that informatics is a phenomenon of global importance for mankind and that it requires the full co-operation of all countries in the implementation of coherent programmes which take into account the special needs of developing countries and are in keeping with the requirements of the establishment of a new international economic order,

2. Deeply concerned by the fact that the unbalanced development of informatics is likely dangerously to widen the technological gap between developed and developing countries,

3. Aware of the urgent need for co-ordinated international action on a large scale to promote the appropriate development of computer techniques, particularly in developing countries,

4. Anxious to find a suitable means of co-ordinating the various activities involved both at regional and international level, to avoid dispersal of effort and to ensure that the recommendations adopted by international authorities, and particularly by the SPIN Conference, are successfully followed up,

5. Subscribing to the idea that in order to ensure that its action is as effective as could be desired, the international community must, as far as is at all possible, implement it within the framework of existing United Nations structures, carrying out whatever adjustments and redeployments may prove necessary,

6. Noting on the one hand that substantial work has been done within the framework of IBI to move the international community to action and co-operation in the sphere of informatics, particularly in respect of the developing countries,

7. Recognizing, furthermore, that IBI is an intergovernmental organization which devotes its efforts and its budget exclusively to informatics,

8. Convinced that if it is effectively to carry out its responsibilities, cover and promote all aspects of co-operation in a field of activity so vital for the future of mankind, IBI must be a truly universal organization in nature,

9. Recognizing furthermore in this connection that Unesco is an international organization which, since its creation, has acquired many years' experience in contributing to the formulation and implementation of scientific, technical and social programmes,

10. Recommends that Unesco, in co-operation with IBI, study ways and means of making IBI an effective instrument capable of contributing to carry out the important co-operation programme which the development of informatics requires.

Recommendation No. 41

The Conference,

Conscious of the importance of hardware and software maintenance for the effective use of informatics,

Taking into consideration the considerable outlay, particularly in terms of manpower, needed to create a national maintenance capability,

Recommends to Unesco and IBI that they take all the necessary steps to further the establishment of national or regional centres enabling countries to undertake, in whole or in part, their own hardware and software maintenance.

Recommendation No. 42

The Conference,

Realizing that the training of personnel and specialists in the field of informatics is one of the highest priorities in most Member States, particularly in developing countries,

Fully aware of the present shortage of trained personnel and specialists in informatics in most countries of the world, especially in developing countries,

Convinced that the training of personnel and specialists in informatics is vital to the development and modernization of countries and should be given priority for international action and co-operation,

Noting that in the United Nations system, Unesco, as the Specialized Agency responsible for education, science, culture and communication, has long experience in organizing training and specialist courses, etc., and has established a network of regional offices for science and technology in all regions of the world to assist Member States and to promote regional co-operation among them,

Believing that broad international co-operation will help systematically to improve and upgrade the level of education and training in informatics,

Recommends that Unesco considerably strengthen and expand its programmes in the training of personnel and specialists in informatics, make available on the request of Member States the services of highly qualified and independent consultants and experts and assist Member States in organizing training courses, seminars, workshops, etc., in order to enable them to train more personnel and specialists, in co-operation with other Specialized Agencies of the United Nations system,

Further recommends that Unesco and IBI actively promote the widest possible exchange of experiences of Member States and the latest information on informatics among Member States,

Also recommends that Unesco, because of its multidisciplinary nature, serve as a focal point for international action and co-operation within the United Nations system by promoting an integrated multidisciplinary approach to the study of and research in informatics in accordance with the principle of self-reliance and within the context of the new dimensions of technical co-operation.

Recommendation No. 43

The Conference,

Considering the increasingly marked interpenetration that exists between telecommunication and informatics,

Noting that certain standards, particularly in the field of data transmission and the devising of character codes, are being worked out by international organizations without reference to the organizations directly concerned with the development of informatics and tele-informatics, such as Unesco and IBI,

Recommends that the international organizations, especially ITU, ISO, Unesco and IBI, co-ordinate their efforts in order to ensure the harmonious development of informatics.

Recommendation No. 44

The Conference,

Recommends:

1. That Unesco and other international organizations promote the signing of multinational co-operation agreements between countries belonging to regions with a similar culture, language and level of technological development, in order to encourage the growth of endogenous technology and the adaptation to the region of technology from abroad;

2. That such organizations lend their support and collaboration to the countries of each region, particularly the developing countries, in order to:

   (a) foster a balance in the development of informatics throughout the region;

   (b) disseminate information about experience in informatics throughout the region;

(c) make rational arrangements for obtaining technical co-operation from outside the region, taking into consideration the cost involved, the sources of co-operation and the colonizing effect of certain technical co-operation programmes;

(d) determine the human resources which the countries could provide on a counterpart basis in order to avail themselves of the benefits of technical co-operation; and

(e) fit the content of technical co-operation into national and regional plans concerning informatics.

ANNEXES

I. Agenda of the Conference

II. Addresses delivered at the opening ceremony

III. Addresses delivered at the closing ceremony

IV. List of documents

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ANNEX I

AGENDA OF THE CONFERENCE

1. Opening of the Conference
2. Election of the President
3. Adoption of the Rules of Procedure
4. Election of Vice-Presidents and Rapporteur-General
5. Adoption of the agenda
6. Organization of the work of the Conference: establishment of two commissions and election of officers
7. Present situation and future prospects of the use of informatics: experiences in the elaboration of national policies and strategies in informatics
8. Basic prerequisites for the effective use of informatics
9. Applications of informatics
10. Regional and international co-operation
11. Adoption of final report and recommendations
12. Closure of the Conference

ANNEX II

ADDRESSES DELIVERED AT THE OPENING CEREMONY

Annex II

Address by Mr. Amadou-Mahtar M'Bow,
Director-General of the United Nations Educational,
Scientific and Cultural Organization (Unesco)

Your Majesties,
Your Excellencies,
Ladies and Gentlemen,

It is a great honour and a deep-felt joy for me to inaugurate with you today this Intergovernmental Conference on Strategies and Policies for Informatics.

I should first of all like to express my profound gratitude to Their Majesties King Juan Carlos of Spain and Queen Sofía, who, by honouring this opening session with their presence, have once again manifested the personal interest they take in Unesco. We are all the more conscious of the honour which Your Majesties are paying us because we realize what admirable work you are accomplishing in Spain.

To be sure, you are the heirs of a very ancient dynasty, but as a Spanish adage so aptly puts it: "CADA UNO ES HIJO DE SUS OBRAS".

Your achievement consists in having reconciled Spain with itself, in having the intense desire to see the Spanish people, who have such an acute sense of dignity, perfect their democratic institutions in a new found harmony and build a future of peace, progress and justice for all their children.

I wish to add my most sincere thanks to all our Spanish friends who have spared neither time nor effort to help us in the practical preparation of this Conference, and to say to the Spanish Government how much we appreciate the fact that this privileged place in Spain, Andalucía, was chosen as the site for this meeting.

Andalucía is a land renowned for its hospitality, as the growing number of visitors who flock here each year demonstrate, and as I have so many times experienced in the warmth of the welcome extended to me in white-walled Antequera, but it is also a melting pot of highly diverse peoples and civilizations as well as an eminent land of culture since it contains some of the most important historical monuments in Spain, and numbers among its sons intellectuals and artists whose fame extends far beyond the Iberian peninsula. I shall mention only two of these. First, Pablo Picasso, the Malagueño, who, while drawing his inspiration from the most remote sources, has left such a deep imprint on contemporary art; indeed, one of his works, and one of the most significant, decorates Unesco Headquarters in Paris. Secondly, I should like to mention Giner de Los Ríos, the creator of the "institución libre de enseñanza", who carried on such fruitful activity for education in Spain and devoted his entire life to a task that is in a direct line with the lofty ideals of Unesco.

I should now like to extend a warm welcome to the delegates of all countries who, by virtue of their number and their rank, have demonstrated the importance they attach to the work of this Conference; a welcome, too, goes to all those who have been good enough to join us, in capacities other than as members of official delegations.

Lastly, on your behalf I should like to extend cordial greetings to Unesco's partner in organizing SPIN, the Intergovernmental Bureau for Informatics, successor to the International Computation Centre set up by Unesco, whose 26 Member States are also taking part in this Conference as members of Unesco, which continues to be a full participant, in accordance with the provisions governing the Bureau's establishment, in its Executive Council and General Assembly.

Your Majesties,
Your Excellencies,
Ladies and Gentlemen,

Mankind has already experienced several technological revolutions all of which have profoundly marked the period during which they took place.

From the advent of agriculture in neolithic times to the discovery of electricity in the last century, they have all brought about major cultural and economic upheavals in the societies which they have affected. There is every reason to believe that informatics in bringing about a comparable upheaval, and this time on a worldwide scale.

There is no doubt that one of the most eloquent signs of this is the establishment that we are witnessing today of a planet-wide information and communication network based on the linking of computers with telecommunications, opening up immense prospects for human relations.

In reality, this amounts to a veritable explosion of new possibilities extending to every field of social activities, and its effects are still for the most part unforeseeable. This is an upheaval which, by the extension it provides for our memory, the transformation it is making in our information systems, and by the modifications that it heralds in our modes of organization and communication, might prove to be as radical as the invention of writing.

This royal tree of human intelligence which plunges its roots into disciplines as widely varying as the sciences, medicine, education, industrial automation, administration and management, spreads its many branches over the whole field of social relations which encompass culture and economics as well as politics. The fruit that it will yield will gradually affect all our everyday activities to an increasing degree. This means that it will bring us face to face with as many challenges as benefits. Every society will now have to come to grips with the basic problem of its control, the practical ways of using it, and its repercussions; hence the importance of defining strategies and policies on which to base its development. Here we see the importance of this Conference whose purpose is none other than to assess the situation throughout the world, to compare experiences and to define the ways and means of achieving the most fruitful international co-operation.

One fundamental fact that should be stressed from the outset is that developments in informatics over the last 20 years have been all the more amazing in that greater efficiency has gone hand in hand with the lowering of costs. The key to these changes no doubt lies in the miniaturization of electronic components. In the recent report by Simon Nora, published in France, on "L'informatisation de la société", it is stated for example that today a micro-processor only a few millimetres square has the same processing capacity as a computer which 20 years ago represented the acme of technological process and which took up a whole room. Furthermore, a component which cost 350 francs ten years ago costs only one centime now.

The consequences of this transformation are vast. They raise legitimate hopes but they also entail grave risks. They may either serve man or enslave him. On the one hand they make it possible to multiply almost limitlessly small machines of low cost and high performance, and to decentralize informatics networks, thereby providing individuals with access to an increasingly broad range of data banks hitherto reserved for a small number of privileged persons. Tomorrow it will be possible to call upon informatics in all the daily aspects of life where its usefulness is essential. Thus a technique of an élitist nature will give way to an activity that will benefit people at large. The phenomenon could be synonymous with freedom. But at the same time, these developments are leading to the establishment of a system of universal satellites carrying images, data, and sound which make all other forms of transmission pale into insignificance. The immense number of users that it will bring into contact and the selection which it may operate in information exchanges could make it a redoubtable instrument of power, which could render many of the attributes of a State's genuine independence or of individual and group initiative null and void.

We thus see looming on the now not too far distant horizon the possibility of a redistribution of world power zones, on the basis of the monopolization of the nerve centres of such a system. Over and above the present inequalities in the distribution of resources and means between the north and the south of our planet, which we are now trying to mitigate, we would see an inequality, within the industrialized world itself, between one or two States, or even one transnational corporation, and the other States which would be reduced to the status of intermediaries or peripheral agents.

Is tomorrow's world, then, likely to be more alienating or more liberating than today's? Is the revolution in informatics going to make all think, feel and live according to the pattern of the few? Or is it going to make possible an infinite number of horizontal, decentralized contacts between different men and different cultures, a continuous process of mutual enrichment, a network of reciprocal relations in every field, which even yesterday we could not have dared to imagine in our wildest dreams?

As at each of the crossroads in mankind's long history, the effects of progress are not the result of a fate decreed by external forces: in the last analysis they depend upon our own wisdom.

The dilemma which the present revolution in informatics poses for urgent solution can then, be expressed as: monopolization or socialization of information? The answer must come from those areas where information is most meagre and the risk of alienation the greatest, that is from the least technically advanced countries. Will these countries still seeking the paths of development which set man free be enslaved by this formidable instrument of progress from a different world - or will they seize upon it as a powerful level, whose creative use can provide a historic short cut to the future?

It is only in the latter case that integration on a world scale can genuinely bring peoples closer together and give them equal opportunities to advance along their own paths of development.

Informatics thus opens up such tremendous vistas for modern societies that any failure to master it would, in the shorter or longer term, mean a life of permanent subordination. For informatics is more than a form of power; it is a power system. The technology which it involves is not just one form of technology among others but an ability to make use of other techniques, to give or to refuse access to a whole range of scientific data and knowledge and thus to design new models of development. In the same way, the information which it communicates is not one type of information among others - it entails the ability to use other types of information, to

process and select them and thus to implement new development strategies.

This is why dependence in informatics may bring in its wake an ever increasing variety of forms of servitude in many areas of life. Any nation which wishes to be a sovereign nation must therefore give consideration to ways of achieving independence in informatics - which means informatics geared to its own needs and aspirations. We must say quite unequivocally that such an achievement, which is seen ever more clearly as a crucial factor in the establishment of a more equitable international order is a challenge to the international community, whose ability to overcome its selfishnesses, to combine its aspirations and its forces and to make fuller and more far-reaching use of its methods of co-operation is seen, now as never before, to be decisive.

But if the appropriation of informatics by any society is necessarily of a collective nature, it also requires a democratic approach to be truly liberating. For it is society as a whole which must be made familiar with informatics if it wishes to control it and make it serve needs that are truly those of mankind.

Otherwise it may be taken over - particularly in the countries that are technically the weakest - by a few key departments or centres of power which may be isolated from their socio-cultural environment, and thus bound to follow imported models and foreign strategies. The establishment of this infrastructure is a matter for political decision: one field rather than another will be supplied with the appropriate informatics facilities as a result of priorities established by the State. It is to be regretted that priority is still too often given to management and control functions of an economic, and sometimes even political and military nature, at the expense of research, cultural promotion activities, education, health services, public transport or irrigation, to name but a few areas of basic importance for the development of the individual and the well-being of society.

The question which thus comes to mind seems to be: will informatics increase the pressures exerted at the top in regard to the base or will it make it possible to find a balance between the minimum of constraints and maximum freedom which has never before been achieved?

The Conference will rightly examine all these questions in the course of its discussions: they will, sooner or later, determine the future of each one of us and call upon each one to do his part.

Unesco, for its part, has been working tirelessly on the two fronts to which it is committed: first of all to provide all States, and in particular the so-called Third World countries with all the assistance they require to train specialized staff, to educate professional users and to promote a general "informatics culture", and then to give practical assistance in the introduction of informatics into specific societies where its unfamiliarity would create a risk of cultural, if not social, disruption.

For nearly ten years now Unesco, having realized the opportunities offered by scientific and technological data banks, has encouraged, inter alia, the establishment of a world-wide UNISIST network. The work done within the framework of UNISIST is designed to encourage the exchange of scientific and technical information between specialists in all countries, to ensure effective intercommunication between different systems of information and different branches of science, to co-operate with all countries desiring access to scientific documentation, to develop the resources and means necessary for rational use of an automatic system and to contribute towards the training of the requisite staff.

UNISIST, which is open to all the Member States of Unesco, thus helps the developing countries, in particular, to obtain access to the latest advances of science and to the technology that is most appropriate to their development needs.

One of the major questions that arise in this field is that of selecting the informatics techniques best suited to each country's "take-off" level and ultimate goal. In this respect, mini-computers and micro-processors seem to open up the richest and most promising horizons.

This is not to say, of course, that these should invariably be selected in preference to "full-scale" computers but that advantage should be taken of the opportunity they provide - particularly for the least advanced countries - to avoid some of the worst distortions experienced by the more highly industrialized countries and to introduce computerization simultaneously at the lower as well as at the upper end of the scale. It is by so doing, it would seem, that these countries will be able to develop an informatics system that is adapted to a multiple technology, open to every innovation and responsive to internal potential of every kind.

In the longer term it will doubtless also enable them to plan for the production of equipment and software that are specifically designed to bring out their autonomous development capabilities. Unesco has always made a special point of promoting and co-ordinating studies along these lines, so as to help all its Member States, and particularly those of the Third World, to gain access to computerization in the form that can best be assimilated and applied to the requirements of their specific situation.

Lastly, there is reason to hope that education, which is a fundamental factor of development, will in turn be profoundly revolutionized by a decentralized and widespread informatics system.

With the exception of research, the use of informatics in education systems has until now been restricted essentially to programme planners and administrators and also, to a lesser extent, to the assessment of knowledge. For some ten years now, however, many universities and certain private establishments have been trying out systems of simulation and of teaching using mini-processors - and the initial results have been extremely encouraging.

These systems, based on control by the pupil himself of an automaton - either real or simulated on a screen - have made it possible, in particular, to perfect new methods for the teaching of mathematics and logic. They have also demonstrated the many opportunities that arise for developing imagination, memory and social communication. There is every reason to suppose that computer games will be used on a massive scale for educational purposes in the near future. The advantage they have is that, unlike most of the present educational games - which impose their own rules on the child - these games allow the child to construct his own rules of play for himself, the computer being no more than an obedient tool that makes an unlimited number of different combinations possible. This example alone shows how the widespread use of computers in teaching that has become possible as a result of lower costs, can be a key factor for the development of the human personality.

Computers will certainly not become automata to take the place of teachers, whose role is indispensable for certain aspects of the educational process, but mass informatics can profoundly transform teaching methods by providing the basis for a veritable teaching system using self-discovery and original intellectual approaches. Above all, it means that the computerized dissemination of knowledge will no longer be the preserve of initiates but will concern a growing number of non-specialists who will have become users of computers as a commonplace procedure in a whole range of everyday activities.

To this end, Unesco is encouraging pedagogical research work and technical studies aimed at the development of low-cost teaching materials. The Organization is convinced that such materials can be produced even by the Third World countries provided they step up their mutual co-operation. It is prepared, for this purpose, to undertake projects and carry out feasibility studies and to set up research and development teams capable of designing new equipment prototypes - making use, in particular, of the various possible applications of micro-processors. We consider that such is the way in which informatics will be able to play a vital part in the assertion of cultural identity of all peoples. Instead of favouring domination by one particular civilization or language, informatics, once at the service of the various peoples, is capable of fostering the development of endogenous cultures and technology by giving qualitative support to their autonomous creative abilities.

The SPIN Conference, I believe, will provide an exceptional opportunity to highlight the importance of a number of ideas for reflection, study and training that are likely to provide the most appropriate answer to the specific needs of the different Member States - especially the developing countries - and hence enable them to work out national and regional informatics policies within the framework of a concerted international strategy.

Your Majesties,
Your Excellencies,
Ladies and Gentlemen,

Unesco, throughout its various fields of competence, basically pursues a single fundamental aim - that of giving the individual human being his rightful place at the centre of all social processes. I believe that such an aim is in accord with an aspiration that is as old as man himself - that of mastering the products of his intelligence and enjoying the fruits of his creative imagination.

Progress in the past, has often benefited the few rather than the many - certain peoples rather than the human race as a whole. History, moreover, can sometimes be looked upon as a series of uncompleted plans or unfulfilled promises.

And this modern age of ours has perhaps been the most fraught with disturbing upheavals. Each passing day sees the increasing unification of the world into an organically integrated system in which every man's destiny tends to be indissolubly linked with the destiny of mankind as a whole. And yet this integration becomes more and more frustrating because it develops along essentially vertical lines that cut across traditional community relationships, concentrating knowledge and power at the system's centres but accentuating individual solitude and helplessness at the periphery.

Men have perhaps never been so close to understanding each other and yet so isolated from each other. The computer revolution now taking place might prove a decisive factor in breaking down this isolation between individuals, groups and regions. It could transform physical proximity into cultural rapprochement, their silent superimposition into mutually enriching exchanges. Then, perhaps, in the history of mankind a full circle would have been achieved: our ancestors communicated directly, from one village to another; our children would be able to communicate directly with each other from one end of the earth to the other.

If our Conference makes only a small contribution to the achievement of this goal the hopes invested in it will not have been misplaced. This is my most fervent wish.

Annex II

Address by Mr. Fermín A. Bernasconi,
Director-General of the Intergovernmental
Bureau for Informatics (IBI)

Your Majesties,
Your Excellencies,
Mr. Director-General of Unesco,
Ladies and Gentlemen,

The honour of addressing you today in my mother tongue is heightened by the fact that I am speaking in the country where it originated.

All the countries associated with IBI's activity are well aware of the importance attributed by Spain to informatics, and the fact that the SPIN Conference is being held on Spanish territory underlines this importance for those not previously aware of it. More explicitly, the presence here of Their Majesties the King and Queen, by which we are deeply honoured, acknowledges the fact that informatics as an economic, social, cultural and political phenomenon reaches the highest level of the country's leadership.

For this presence and this acknowledgement I wish to express on behalf of IBI our gratitude to Your Majesty, while paying a respectful tribute to Her Majesty the Queen.

My address, after a brief history of the IBI up to the present Conference, will deal with three fundamental concepts:

(1) Informatics and development;
(2) The new context; the New Informatics;
(3) Information flow and data banks;

and conclude with a number of reflections.

Brief history

Most of the participants already know that our associate in the organization of the present Conference - Unesco - is a founder of the former International Computation Centre, an organization whose gradual transformation process over a period of almost five years, has led to the present IBI - the Intergovernmental Bureau for Informatics. This body was set up in December 1974 and its field of competence coincides exactly and exclusively with what is today one of the leading and most important world industries.

I wish here to acknowledge Unesco's constant support, and its understanding of the many problems that a chrysalis has to face before becoming a butterfly able to take wing. Such support, together with the active participation of its Member States has made it possible for IBI, the sole intergovernmental organization specifically devoted to informatics, to exist today as a vigourous organization in full development.

When, in the late stage of its transformation process, the IBI-ICC, as it was then called, convened, in 1974, a meeting of eminent representatives in the field of international informatics - many of whom are here today participating in the Conference which is the result of their efforts - the first problem was the title of the newly-created Committee. And it was Jean-Paul Costa, an efficient and highly appreciated ex-colleague, here today as a member of his country's delegation in his official capacity, who with his usual creativity, suggested the name of SPINCO (Strategy and Policies for Informatics Committee).

The idea of this Conference - which from then on was referred to as the "SPIN Conference" - stemmed from the first SPINCO meeting. John Fobes, who was at that time Deputy Director-General of Unesco and is today the head of the United States delegation to the Conference, expressed the interest of the Unesco Secretariat in joining this initiative.

The General Assembly of IBI approved, for inclusion in the Organization's programme of activity, the preparation of the SPIN Conference to be organized in co-operation with Unesco.

For their part, Algeria and Brazil, both SPINCO members, submitted to the General Conference of Unesco a resolution along the same lines, which was also approved.

The vigilant and constructive support provided from the outset by my colleague, Mr. Amadou-Mahtar M'Bow, Director-General of Unesco, has enabled this potential to be translated into reality and through the efficient work of the respective Secretariats we are today establishing the foundation for what may some day be the new international information order, an essential part of the process of bringing into existence the new international economic order.

We have no doubt about the world-wide follow-up to the SPIN Conference in the near future, of which there are already some signs, as reflected in the fact that the Economic and Social Council of the United Nations, in a resolution dated 1 August 1978, invited the Directors-General

of Unesco and IBI to submit a report on the results of the SPIN Conference.

We also feel sure that the SPIN Conference will be a milestone along the road which leads mankind into a new Age.

Informatics and development

The time is ripe for a decision of crucial importance. Today's developing countries are those which missed out on yesterday's industrial revolution; those of tomorrow may well be the countries which will miss out on the informatics revolution which is taking place today.

On 5 July last in Geneva, during the ECOSOC meeting which approved the resolution on the SPIN Conference previously referred to, Mr. Kurt Waldheim, Secretary-General of the United Nations, noted the failure of the development efforts undertaken in the Third World countries. Hence, the question to be answered is whether the time has come to adopt a different approach and to think in terms, inter alia, of helping these countries to equip themselves with informatics systems aimed at improving or creating the required management infrastructures, the lack of such structures being a constant factor of underdevelopment.

The utilization of informatics is therefore necessary as far as development is concerned; in all countries, regardless of their size, informatics has economic, political and socio-cultural implications.

The new context; the new informatics

Informatics, as a result of technological progress, has grown at a rapid and sustained pace which has, so far, enabled us to foresee future developments with reasonable certainty.

This is no longer valid. A breaking point in this continuity has been reached, and all one can predict is that a new context will come into existence and that it will be characterized on one side by the massive presence of informatics in each and every manifestation of mankind, and on the other by the integration at world level of informatics systems into large networks.

The first phenomenon drew its origin from the micro-processor. Today in a chip of less than 1 cm^2 and costing under $20, 50,000 transistors can be placed; tomorrow, it is already being announced, this same chip will have the capacity of the systems of the highest power range known today.

This has an impact on education: what type of personnel should be trained? And on industry: what type of industry? On national security: technological dependence assumes different forms. The socio-cultural impact of informatics must be reviewed in the light of this new reality, which could bring about a return to life in the small community, with all the advantages and none of the disadvantages of the large urban conglomerations. We are defining a humanized informatics oriented towards the individual.

This whole new context, which gives shape to a new informatics closer to man and more in keeping with the requirements of developing countries, needs the support of a second dimension previously referred to, that is to say the combining of informatics technology with telecommunications.

This relationship is not devoid of imponderables and the interests involved are of a greater magnitude than those with which many countries can cope.

The trends are taking shape before our very eyes. The expansion of the market leads producers of informatics products to enter the field of telecommunications, and the latter, similarly, to penetrate that of informatics.

By being constantly transgressed, the virtual frontier which existed between the two domains has become blurred and is tending to disappear due, particularly, to this convergence of technologies. The world is seemingly evolving towards a confrontation in the short term between the principal protagonists of informatics and telecommunications; a confrontation which can produce significant modifications in the commercial and technological context and whose effects will certainly be reflected in each and every country.

In the formulation of its recommendations the Conference should bear in mind this new context whose development is difficult to predict, since it is in this new context, and not in that existing at present, that its recommendations will be implemented.

Information flow and data banks

As previously mentioned, two main axes are traced for informatics development: the proliferation of highly reliable, powerful and low-cost information processing equipment, on the one hand, and on the other, the appearance of new digital transmission systems and specialized satellites which enable data to be transferred at great speed and low cost, irrespective of the distances involved.

The combined effect of these two axes of informatics development will intensify a phenomenon which is already very marked, especially among the more advanced countries and which will shortly be a subject of concern for other nations. I am referring to the flow of data across frontiers and their accumulation in large banks.

The ultimate objective of all informatics infrastructures, independent of their technical complexity, is information handling.

To consider the problem of information circulation is to enter into the very heart of the debate on an essential requirement of the international economic order. This debate involves many and varied political, economic and socio-cultural aspects.

Those who advocate the free circulation of information are often opposed, on the grounds of State security, the rights of physical and juridical persons, copyright and political, social and economic responsibility in general. A country using foreign models and data banks must fear, justifiably, becoming the centre of a cultural conflict; it must be concerned at the possibility of ultimately

being the victim of cultural homogenization. Other countries require that the integrity and right of access to their data banks existing abroad be guaranteed, a question with extensive implications in the national security sectors.

The problems of data collection and their transmission across frontiers and in outer space, as well as the establishment of tariffs associated with these processes raise a multitude of still unsolved problems which could adversely affect the smooth flow of information which, from both the economic and technological standpoints, is a necessity.

In the last two years a multitude of initiatives have been taken and in this respect there must be recognition, as far as Europe is concerned, of the pioneer action of OECD. We feel that the time has come for all countries, and especially the developing ones, to have access to this subject which is universal.

Some reflections

A generally accepted conclusion, and one that has already been mentioned, refers to the need to make the utilization of informatics universal in order to contribute to economic, social and cultural development. The present great technological concentration must be transformed so that all countries, large and small, may assume their own responsibility in the field of research, development, industrialization and adaptation of informatics, ensuring the transfer of knowledge between them.

The preceding concept and the others expressed in relation to data transmission, confirm my impression that international co-operation has excellent possibilities of success in helping to bring about a new international order which will reflect respect for the private life of citizens, ensure intelligibility in the international exchange of information, and respect for the sovereignty of States.

And now, to conclude, I would like to revert to the concepts with which I began. The fact of holding the SPIN Conference in Spain prompts the wish to pay tribute to a country which is in the forefront as regards informatics policies, which understands the international dimension of the informatics phenomenon, to the extent of hosting on its territory a Regional Centre for Education in Informatics in Spanish (CREI).

To conclude this tribute, I wish to express my most sincere gratitude to the Spanish officials who have contributed to the success of the Conference, and to the Kingdom of Spain for its generous and traditional hospitality.

Address by
His Majesty King Juan Carlos

Mr. Director-General of Unesco,
Mr. Director-General of the
Intergovernmental Bureau for Informatics,
Your Excellencies,
Distinguished Delegates,
Ladies and Gentlemen,

Here on this coast of Málaga, which for many years has been a gathering place for men and women from every continent and a symbol of peace and union among peoples, we are meeting today to inaugurate the proceedings of the first Conference on a world scale on strategies and policies for informatics.

Informatics - that science and technique which still fills the uninitiated with feelings that range from incredulous scepticism to a blind faith in scientific progress as a solution to the problems of mankind - has merited the attention of governments and international organizations, which, accepting the challenge that this progress represents for them, have decided to send their representatives here today. This is because they know - because we know - that these computers, with their amazing memories, calculating capacities and rapidity, constitute a powerful tool in human hands; hence we should, and do have an obligation to understand and control the potential that they offer us.

It is now common knowledge that informatics is an irreplaceable instrument for coping with the profuse information which reaches us daily and that it places at our disposal the data which form the basis for all the economic and social development of our communities.

Until recently such information was neither assimilable nor apprehensible, but today, thanks to the computer and its capacity for calculating and storing information, we can look to a future in which man will have access to all those social elements that will enable him to change his destiny.

But like any scientific achievement, like every victory that man achieves over himself this one has no potential for development unless it is shared with others. Telecommunication in this sense is and should be the vehicle for informatics. Only by bringing technical and scientific advances and economic and social experience within the reach of everyone will we have any hope of achieving the more harmonious development of mankind.

We are standing on the threshold of a new era in which informatics is about to revolutionize our lives. To provide it with the means it requires, to channel it and above all to humanize it is the challenge which progress has set for our countries and the real reason why they decided to send their representatives to this Conference today.

Ladies and gentlemen, it is my hope and wish that this Intergovernmental Conference on Strategies and Policies for Informatics which is about to be held in this beloved land of southern Spain may precisely be one of those forums where people from all parts of the world strive for understanding and co-operation, and that they may find in this path which is opening up and in this science which is at its beginnings the very best that progress has to offer us.

This, in my view, should be the underlying significance of this Conference and the one that I earnestly desire may be attributed to it so that the results it achieves will give reason to hope that discussion and the exchange of opinions and experience may prove to be the sole way for men to live in peace. Thus we may affirm that science will once again attain its desired goal, one which is directed towards the development of man's own capacities.

Trusting that your stay in Spain may be a happy one and that your work may be crowned with success, I hereby declare the Conference open.

ANNEX III

III. ADDRESSES DELIVERED AT THE CLOSING CEREMONY

Annex III

Address by Mr. Amadou-Mahtar M'Bow,
Director-General of the United Nations Educational,
Scientific and Cultural Organization (Unesco)

Mr. President,
Ladies and Gentlemen,

As this first Intergovernmental Conference on Strategies and Policies for Informatics draws to a close, I have particular pleasure in referring, first of all, to the fortunate and exceptional circumstances surrounding this work.

Their Majesties, the King of Spain and Queen Sofia, by honouring the opening session of this Conference with their presence, marked from the very outset its significance for the progress of peoples and for co-operation between nations. Their gesture was most moving and I would ask you, Mr. President, to express to their Majesties once again the fullness of our gratitude.

I should also like to stress, Mr. Minister of the Presidency, our appreciation of the solicitude shown by the Spanish Government towards this Conference in conferring on you the leadership of the large delegation of your country. May I thank you most sincerely, Mr. José Manuel Otero Novas, for the courtesy, patience and efficiency with which you have guided the discussions. As a token of our gratitude to you all, I should like to present you, on behalf of Unesco, with the silver medal created by its Executive Board to honour those who have made an invaluable contribution to the Organization's activities.

The authorities of the Province of Málaga have spared neither time nor effort to facilitate our work in creating such a favourable atmosphere for us, and I extend my warm thanks to the Governor, the President of the Diputación and the Mayor of Málaga, whose assistance has been so helpful to us in organizing this Conference.

None of us, I am sure, will ever forget the warm hospitality of Andalucía, this land so charged with history and so imbued with humanity, nor shall we forget the charm and generosity of the Spanish people who received us with their usual spontaneity.

I should like to thank the Rapporteur-General and the Chairmen and Rapporteurs of the commissions for the important and difficult work which they have accomplished in order to enable the Conference to complete its task within the allotted time.

May I also express my gratitude, on behalf of the United Nations Educational, Scientific and Cultural Organization, to the delegates, both men and women, whose active participation and high ideals have made the proceedings of this Conference so rewarding and so unruffled despite the complexity of the questions considered.

My thanks go also to the sister organizations of the United Nations system whose representatives have made an invaluable contribution to the discussions. I refer to the International Telecommunication Union, the International Labour Organisation, the World Health Organization and the World Intellectual Property Organization, as well as the United Nations programmes, that is to say, the United Nations Institute for Training and Research, the United Nations Industrial Development Organization and the United Nations Environment Programme. Lastly, I would thank the intergovernmental organizations and the international non-governmental organizations for their presence and for their participation in the discussions.

Mr. President,
Ladies and Gentlemen,

The time normally alloted to a closing speech is too short for allusion to be made to all the lessons that can be learned from discussions as constructive as those that have taken place here during the last ten days and so I shall confine myself to mentioning certain subjects of concern that have emerged from your discussions and which are reflected in the recommendations you have drawn up.

The first point to be noted, as shown in your discussions and the recommendations you have adopted, is the need to develop the use of informatics, which has become a key tool of economic and social progress. The volume of information required for the establishment of national development plans is such that it can no longer be analysed with the necessary speed and efficiency without computerized means. The manifold applications of informatics open up, moreover, vast prospects for the development of knowledge, the flow of ideas, communication between individuals and peoples, improvement of the productivity of labour and the organization and management of administrative undertakings such as modern commercial enterprises. In the industrialized countries, therefore, as is clear from many of the statements made, informatics has already

become to a large extent part of the way of life; it has gone hand in hand with growth in economic activities, particularly those requiring recourse to a very considerable volume of data. The developing countries, for their part, are becoming more and more aware of the need to achieve greater mastery over informatics techniques in order to bring about the modernization of management and production structures and promote the introduction of science and technology. And yet, while affirming the need to encourage recourse to informatics, many of you have expressed your concern - not to mention your misgivings - and sometimes even a degree of scepticism, concerning the possibility of access by all nations to the most appropriate informatics techniques. The aspirations expressed in the course of this Conference have, thus, been compared with "the feeling that the quest for, and hopes in, a new international economic order are stagnating dangerously". It cannot be denied that the hopes placed in the founding of a new international economic order have scarcely been realized during the period since the launching of the appeal in 1974 by the General Assembly of the United Nations.

Unesco, for its part, has spared no efforts to promote reflection and action in connection with it. In a work entitled "Moving towards change" dealing with this great enterprise, I have stressed the importance that must be assigned, in this connection, to the development of communication and the information media as well as the need to take full account of the demands of education, science and culture. Informatics, moreover, necessitating as it does a global approach to scientific and technological, social and economic activities, one that is already transforming the industrial societies into information-based societies and is providing all countries with new opportunities in regard to planning, could no doubt assist countries to accomplish their development more effectively and accelerate it.

Following the same line of thought, there were two remarks that stood out in your discussions: first, that the developing countries, often because of the scarcity of their material and manpower resources, concentrate their computer resources almost exclusively on management problems. Although this represents a legitimate choice of priorities so far as they are concerned, the question arises whether it would not be in their interest to devote a more substantial proportion to social sectors such as education and health. The other remark is that, by means of more frequent and effective exchanges and contacts, the developing countries could benefit from the experience gained elsewhere. Certain developed countries, for example, make efforts to use informatics in order to improve relations between administrators and those under their administration, an essential aim when we consider the growing importance assumed by administration in modern society. The fact of inadequate administrative staffing in the developing countries should undoubtedly encourage them to give greater attention to such procedures.

The second point is more appropriately expressed as a question: "How is computerization to be carried out?" Information raises, indeed, many questions. You have in fact answered some of these questions but others remain unanswered or are not answered to the satisfaction of all.

Informatics, and particularly "telematics", call increasingly for the adoption of strategies based on the requirements of the overall plan or general programme for economic, social and cultural development. For choices become meaningful only if they have full regard for specific national requirements, are perceived as a coherent whole and are designed to ensure that any form of alienation is avoided. This is why, at the very beginning of your debates, many of you stressed the need to develop endogenous production capabilities without renouncing the necessary external assistance.

In the present state of affairs, many industrialized or developing countries have no choice but to obtain their equipment on the world market; the countries which are able to manufacture their own integrated circuits can be counted on the fingers of one hand, and this situation is not likely to change very much in the near future in view of the present condition of the world economy and the concentration of technological progress in a limited number of countries. The only course of action open to the majority of countries is thus to try to influence the world market by encouraging the most open form of competition and by studying the whole range of products offered in the most minute detail. Unesco is ready, in co-operation with the appropriate bodies, to assist Member States in taking concerted action or to help them by placing highly qualified experts at their disposal or, if they so wish, by advising them on the formulation of general or sectoral informatics programmes. It is also willing to assist them in creating regional associations which will enable them to strengthen their co-operation and improve their access to the knowledge and skills acquired in other countries.

As far as the applications of informatics are concerned, your discussions have made it clear that certain countries already have the capacity to produce software which is adapted to their own situation; and the establishment of software banks accessible to all countries has also been suggested.

Finally, a very serious issue is looming on the horizon: the question of employment. At a time when unemployment and underemployment are no longer the unenviable privilege of the developing countries, the risk of further aggravating them by extending the use of informatics is always present in our minds, even if there is a hope that by means of informatics employment openings may be created in other sectors. This raises the important problem of taking the whole range of social and economic factors into consideration when planning and implementing action in informatics.

I now come to a third point which gives rise to questions and also some misgivings: just as industrial progress has helped to accentuate the

between States, scientific progress in general and that of informatics in particular are now accelerating this process. Even disparities between different developing countries may be accentuated. Only international co-operation and intensive efforts to assist the least privileged countries could prevent a further widening of this gap which continually divides one group of countries from another. Thus certain measures, even if they may be regarded as inadequate, acquire a measure of importance, the extension of training, cost-free access to software banks and group purchasing arrangements for equipment are no more than a few examples. But there is a risk not only of disparities between nations but also of disparities within individual countries: the development of informatics, even when it has become a commonplace and widespread phenomenon, might result in preferential treatment for a minority at the expense of the majority.

Some people have wondered whether informatics has only beneficial effects on the organization of society, for although its influence on political structures is not decisive, it is not negligible. There may be a great temptation for those in power to use computers to consolidate that power by exerting pressure on a considerable part of the population, through the information centralized by them. Another danger that has been the subject of frequent warnings is the accumulating of information of all kinds about individuals to the extent that the privacy of their lives is jeopardized. The use of data transmission networks and their transnational routing also raise problems of an institutional, political, economic and even security nature. For all these reasons, it seems necessary, as many of you have pointed out, to adopt suitable national laws and international conventions.

To be sure, in many countries such serious problems as poverty, unemployment and inflation, to mention but a few, have assumed such proportions that they monopolize political considerations and absorb resources to such an extent that computerization is relegated to a secondary level. One of the merits of this Conference is that it will probably have helped to alert the leaders of Member States to the possibilities of informatics and to the need to have a certain control over it in order to promote development more fully.

I now come to international co-operation, the importance of which you have stressed, and to the role that Unesco can play in such co-operation within the larger framework of the institutions of the United Nations system. You have expressed the wish that such co-operation be established at all levels - bilateral, regional and international. Some delegations, however, have shown a preference for international action. Many opportunities for co-operation have been referred to and you expect the international community to promote the exchange of experience and information between States, to help countries find ways and means of reducing their dependence on the designs of manufacturers, to assist in making commercial practices more ethical and to encourage the establishment of regional maintenance centres. It is also your wish that informatics projects are taken into consideration by the international financing organizations and that the international community help in training informatics personnel - as well as users, and, indeed, the public - through the organization of courses and seminars, the creation of regional education centres and the granting of fellowships in the home country or abroad. Lastly, the international community must furnish the conceptual framework and the assistance needed to facilitate the dissemination of tele-informatics and access to data banks, or to study and foresee the socio-economic repercussions of computerization, particularly on employment. In short, international co-operation should provide the methodological and technical means as well as the resources needed for the establishment and application of national policies for informatics in keeping with each country's characteristics and under the full control of States. As one participant has said, when it comes to informatics, all countries are developing countries. Thus international co-operation may be beneficial to all and it should involve all States if we wish national egoism to give way to real solidarity accepted by everyone, for the benefit of all the peoples of the world - for informatics, and I cannot stress this enough, is meaningful only if it furthers the advancement of all peoples, human happiness and better mutual understanding.

Mr. President,
Ladies and Gentlemen,

The thorough understanding of the problems of informatics and its techniques shown by the many delegates at this Conference has made it possible to establish a broad consensus on certain of the main subjects that were studied. The high standard of the speakers has meant that we have gained an insight into many different aspects and has contributed to the success of your work. Of course we may regret that only slightly more than half the Member States of Unesco were able to be represented at this Conference despite my appeals, and that some felt it necessary to express reservations about it or certain of the lines it followed; I trust, however, that ways and means will be found of overcoming such reservations and that those who are absent today will be partners tomorrow, and I have no doubt that in the future they will take an active part in international co-operation on the subject that has brought you together here.

The international community should strive to find new avenues of co-operation in the field of informatics, taken in the broadest meaning of the term, for fresh thought must be given both to the dimensions of such co-operation in order to extend it, and to its content, so that it may be given a more appropriate and equitable form. The Conference has reflected a wide measure of agreement among Member States as to the goals to be attained and, if some differences of opinion were expressed or fine distinctions made concerning the means to be employed, this is no

doubt because imagination must be applied in order to discover more appropriate ways. Unesco should likewise redeploy its means and rethink its mode of action in informatics in order to take account of the recommendations made by the Conference. It should draw, perhaps, more fully on the experience acquired in the large-scale intergovernmental scientific programmes such as the MAB programme which deals with man and the biosphere, UNISIST which covers scientific and technical documentary information, or the specific programmes concerning the environment, water resources, the oceans and geology, which make it possible in an original manner to combine the efforts of all Member States and scientific communities. Each programme, directed by a board made up of official representatives of Member States, is supported, at the same time, by the active participation of thousands of specialists in the fields concerned, as well as by their national, regional and international scientific associations.

As you are aware, I shall be submitting the results of your work to the forthcoming session of the General Conference of Unesco and to the United Nations Economic and Social Council, and I shall convey to them the tenor of your discussions. Informatics concerns, on several counts, a good number of the organizations of the United Nations system, and co-ordinating machinery has been set up for the purpose of combining their efforts. I shall mention only the principal of these bodies: the Administrative Committee on Co-ordination, which periodically brings together the Secretary-General of the United Nations and the Directors-General or heads of the international organizations - together with the Inter-Organization Board for Information Systems and Related Activities, which is one of its subsidiary organs. I am convinced that the means and the experience at the disposal of the United Nations system will make co-operation in the field of informatics fully meaningful and will make it possible to work on a world-scale for the benefit of the entire international community and for its most underprivileged members in particular.

Unesco must indeed develop still further the fruitful collaboration in informatics - and particularly in the field of computerized documentation - that it has initiated with, for example, the International Labour Organisation and the United Nations Food and Agriculture Organization, and extend it to other fields and to other organizations of the the United Nations system, such as the World Health Organization. Needless to say, Unesco is ready to extend still further its collaboration with the intergovernmental organization IBI and, as it has always done, spare no effort in providing it with support and guidance. It also hopes to associate interested non-governmental organizations such as IFIP (International Federation of Information Processing) and national or regional institutions, more closely in its work. There is thus a vast undertaking awaiting those whose task it is to further international co-operation.

Mr. President,
Ladies and Gentlemen,

This Conference has provided the occasion for perceiving the diversity of problems and situations, the magnitude of the needs in respect of informatics and the complexity of the means to be deployed, to the extent that a degree of pessimism has sometimes been apparent as to the real possibilities of effective action on a short-term basis; it has, however, also enabled us to trace in broad outline the course of action that holds out promise for the future.

May I then, in conclusion, echo the words of one of the most eminent sons of this enchanting region of Andalucía, the poet Juan Ramón Jiménez, Nobel prize-winner for literature: "Estamos tristes de hoy, pero contentos para mañana".

Annex III

Address by Mr. Fermín A. Bernasconi,
Director-General of the Intergovernmental
Bureau for Informatics (IBI)

Mr. President,
Mr. Director-General of Unesco,
Ladies and Gentlemen,

When we began to plan this Conference four years ago, one of our main preoccupations was to expand the concept of informatics into a broader concept than that of the computer sciences; another concern was to give general currency to the idea that it was necessary to formulate national informatics policies and to determine the appropriate authorities in that sphere.

Those objectives have today been left far behind, as has already clearly been shown by the survey - in which 70 countries took part - carried out by IBI as the basis for a reference document. The statements made, the quality of the debates and, finally, the conclusions and recommendations endorse this view and show how the idea and concepts of informatics have evolved to an extent meriting discussion in an intergovernmental forum such as this.

One of the participants at this Conference jokingly said to me: "This Conference is a first-time event in the history of mankind".

I was about to smile at the exaggeration of this statement when I remembered the fact that every joke always contains a grain of truth; that truth, ladies and gentlemen, is that, right here, you are in the process of shaping the future - and thereby establishing the foundations of history.

Some of the consequences this Conference will have are difficult to discern today, but we do know that they will be long-lasting and will determine the way in which States develop their informatics programmes and also how they will view and analyse international relations in this sphere.

As regards its consequences for IBI, I can say that the responsibilities this Conference places upon us are immense and that we will do everything necessary to face up to the needs of the developing countries that have been expressed here and to be worthy of the expectations placed in the work that IBI is in a position to carry out in order to satisfy those needs.

The expressions of support, encouragement and confidence in IBI that have been expressed by many delegations from both Member and non-Member States commit us to making an all-out effort, and I trust that that effort will be equal to the task. I therefore say to all of you here: "HELP US TO HELP YOU!"

At all events, we are ready and we accept the challenge. Each and every one of your recommendations will be studied and evaluated and, what is more important, ladies and gentlemen, they will be incorporated into the Draft Programme and Budget for 1979-1980. This flexibility and ability to act promptly is one of the advantages of the small size of our Organization.

From the brief general survey we have already made of the work of the Conference and from the excellent statement given to us by the Rapporteur-General - to whom I would express my congratulations and appreciation for his excellent work - there emerge, in fact, certain lines of emphasis that already form part of IBI's programme of action; when I speak of the programme I am referring to the 1977-1978 biennium, which means that the preliminary actions or studies have already been accomplished and that the initial results are already available.

Four major areas may be identified in your work:

1. Co-operation to enable States to implement their informatics policies and programmes, making use of existing experience. To cite a few examples, countries receiving IBI missions in this field of its competence include Chile, Ecuador, Lebanon and Tunisia. Turning specifically to bilateral co-operation, there have been a number of IBI missions in that direction, and IBI has acted as a catalyst for that purpose. We are satisfied with what has been achieved to date, particularly in so far as bilateral co-operation between developing countries is concerned.

2. The transfer of software, which unlike hardware, is becoming progressively more expensive, with the relative burden it represents in informatics systems growing even more onerous as new technology is introduced. In this area, IBI has developed a programme for transferring software between countries and has prepared an initial catalogue which is already available.

3. The need for the transfer of every kind of technology, in the fullest sense and without the least discrimination, was a subject that recurred

constantly throughout the Conference and one with which IBI has been concerned for some time, particular importance being attached to the establishment of information systems on informatics.

A full study was made in collaboration with Unesco, and the idea of a World Information System for Informatics (WISI) was developed. This is an ambitious project that will take time to become operative but, since the needs are urgent, IBI has set up for the purpose - as an interim measure and as a basis for the future system - an Automated Informatics Documentation System (AIDS). This has been demonstrated here at the Conference during these past few days and is even operating in one of the halls of this Congress Centre.

4. The fourth point is clearly education - and more particularly training and further training. It has frequently been stated during the Conference that such training should be carried out on the basis of regional centres. The "Centro Regional para la Enseñanza de Informática en lengua española" (CREI) (Regional Centre for the Teaching of Informatics in Spanish), which operates in Madrid, is a joint undertaking with the Spanish Government that enables this activity to be carried out along the most suitable lines, as regards language and cultural aspects, for Spanish-speaking countries. We are thinking of extending this activity to the languages and cultures of other regions. In this connection, I should like to refer back to what I said earlier about the preparation of our Programme and Budget for 1979-1980. To begin with, the programmes referred to will be strengthened, and, in particular, the experience acquired in respect of the regional centres will form the basis of further projects, with the respect for cultural considerations that I have already mentioned. However, apart from the strengthening of programmes relating to the four points mentioned, I should now like to speak about three new areas in which it seems essential to take action:

(1) New techniques, especially miniaturization, which make it possible to conceive of an informatics system in which national resources would play a considerable part, whether in respect of installation, maintenance or utilization. IBI, which in recent months has already built up its research potential in this matter, is preparing to collaborate effectively with its Member States in this area.

(2) Standardization, an area which concerns many aspects of informatics but in which, this Conference has pointed out, even the little that has been done has been damaging, particularly in connection with the transfer of technology. IBI within the limits of its competence, is prepared to promote this aspect and to collaborate with the bodies responsible for implementing it.

(3) Third and last: the question of transnational data flows, which I mentioned at the opening of the Conference and which has, moreover, been the subject of a special debate in Commission II. In this connection, I should like to inform you that the holding of a Conference on this question at the end of 1979 is proposed in IBI's Draft Programme which is due to be approved by the General Assembly. This Conference, which will probably be an informal rather than an intergovernmental one, will follow the lines of the conferences held in Florence (1972), Mainz (1974) and Baghdad (1975); to this end, we have been in touch with the leading European bodies working in this area.

It will be the first occasion on which it will be possible to discuss this subject, which is of universal import, conjointly with participants from all over the world. An information note concerning this Conference is available.

Actions, however, ladies and gentlemen, are not fully meaningful unless we define the context in which they are to be carried out and the general goals towards which they are directed. Allow me, therefore, to define that context: Man, society and the State are approaching an unprecedented world crisis. Indeed, the threatened exhaustion of energy resources together with the population explosion, the unequal distribution of wealth and power, and other factors, are leading mankind to the brink of crisis, beyond which a chain reaction of destabilization will be produced, with unforseeable results. In this context, informatics causes major modifications in the main variables involved, and those modifications may in turn accelerate and aggravate the crisis.

On the other hand, informatics provides at the same time, the means to face up to problems of an extreme complexity, such as those we have just cited, in which the ability to resolve and settle conflicting interests is vital.

It is up to us to ensure that the smooth development of informatics and the discerning use of it in every part of the world may be brought about in time to avert these dangers and build a better balanced society.

I have had occasion at different times and in various circumstances to thank the Director-General of Unesco for the help that his Organization has always given IBI. To those thanks I feel I should add a special word of appreciation to the staff of Unesco and, indeed, to the staff of IBI as well as for all their endeavours both before and throughout this Conference to make it a success.

In conclusion, and now the time has come to give renewed thanks to the Spanish Government and particularly to those officials who have worked so hard to smooth our path during this Conference, I should like to express my gratitude by quoting to you an old Spanish proverb which I have taken as a guide for many years now: "With truth, I neither offend nor fear".

Proverbs, ladies and gentlemen, generally express in simple words the wisdom or the characteristics of a people. In the case of the proverb I have just used, it clearly demonstrates the noble spirit of the Spanish people.

With this illustration, and our renewed thanks for the generosity with which we have been welcomed, I pay tribute to the Spanish people in the person of our President.

Annex III

Address by Mr. Luis M. Laurelli,
Delegation of Argentina

Mr. President,
Ladies and Gentlemen,

The Steering Committee of the Conference has conferred upon me the great honour of asking me to express, in a few words, the feelings of the members of this Conference at this closing ceremony of the SPIN-78 Conference.

I did not wish my words to have an exclusively Latin American significance, and various colleagues from other regions have associated themselves with me so that my remarks should not be those of a single delegation but should have a universal flavour - that is to say that they should reflect the general feeling, expressed with the greatest possible humility and sincerity.

This honour is now tinged with poignancy, for the time has come to say farewell. My words have a deeply-felt significance by virtue of the fact that the moment has arrived to take stock of the results of our presence in Torremolinos; they have a future import because, although our work in this Congress Centre is in the present and tomorrow it will be over, it will give birth to a new approach to informatics that looks to the future - to progress in this science and in the international community.

Now that the time has come to say goodbye, we must not only take stock of our work but also turn over in our minds those other positive features - all the events that shape our present attitude.

Tomorrow, this land of Spain, blessed with sunshine, nobility and grace, will form for us an indelible memory. Today, we have to express our innermost feelings as we take our leave.

It is not easy to put this into words, but what I should like to do in this statement, on behalf of all of us, delegates from every continent, is to set formality and protocol aside and express our gratitude to you, Mr. President, to the national and local government authorities, to the Spanish delegation and to the people, and our feelings of regret at leaving your country.

Here, at the SPIN-78 Conference, Their Majesties the King and Queen of Spain paid us great courtesy and honour. Their support was expressed in words that constituted an important landmark for the work of our Conference, and we are deeply grateful to them for this gesture.

Turning to you, Mr. President, we see today how right we were in electing you by common accord to guide our discussions. Our unanimous judgement produced the expected result: it has been upheld by events.

Your guidance, authority and deep understanding of human nature guided us safely to the constructive conclusion of our deliberations. You have been, moreover, a President who has never had to use the gavel, a President who took the helm of SPIN-78 by dint of the qualities of good sense and realism that mark you out as an exceptional personality.

We must acknolwedge and thank the two organizations - Unesco and IBI - their respective Directors-General, the Joint Secretariat and the ancillary services for guiding our work by means of documents and direct participation in the discussions that matched the level of the successful result of this Conference.

Mr. President, our regret at leaving is infinite. We cannot individually thank all those members of the Spanish Goyernment and the Spanish public for all the courtesies we have received, for their warmth and for the generosity of their welcome.

That hospitality and those virtues are eminently represented in Their Majesties, the King and Queen of Spain, who did us the honour of opening wide the portals of the nation to us. You, Mr. President, acted as our host, put us on the right road and showed us our true objective - the total success of this SPIN-78 Conference.

The Spanish delegation, exerting itself to the utmost throughout, was more than efficient in accomplishing the tasks that devolved on Spain in connection with the organization of this Conference. Its work complemented and equalled in importance that carried out by the two organizations sponsoring this great Conference.

There is no need for me to refer to the proceedings of SPIN-78: the Directors-General of Unesco and IBI have already analysed its highly successful work, which will be summarized for us by the President. The purpose of my speech is to fulfil the deeply felt need to express the warmth of our feelings towards our Spanish friends and brothers.

We wish them, as we wish you all, peace,

health and prosperity. It is a pleasure to be among you, and we owe you a debt of gratitude for the fact that here we have found a living token of friendship.

Mr. President, it is with heavy hearts that we wish you goodbye for the present. For everything you have given us, many, many thanks.

I think there is only one way to sum up how we feel, and I invite my fellow delegates to mark with me our feelings, our regards and our gratitude with a round of hearty applause. Thank you very much, Mr. President.

Annex III

Address by Mr. José Manuel Otero Novas,
President of the Conference

Mr. Director-General of Unesco,
Mr. Director-General of IBI,
Members of the SPIN Conference Steering Committee,
Delegates and representatives of the countries and organizations present at this Conference,
Ladies and Gentlemen,

Before beginning my speech, I should like to say publicly what a great honour it has been to me to receive the silver medal of Unesco, and I should like to thank the Director-General of Unesco personally, and Unesco as an institution, for the award. I shall be proud to keep this medal in my office and display it as a souvenir - a souvenir of Unesco, in the first place, and of its Director-General, but also, in a way, as a souvenir of this Conference and of you all.

When I addressed you for the first time on 28 August to commence the work of this Conference after its opening by His Majesty the King, I told you that my desire was to promote practical and constructive work rather than attempt to make brilliant speeches from the chair. Such has been my working principle throughout this Conference, and I do not intend to renounce it now when we have reached the culminating moment of its closure. I shall therefore try to be equally brief in this final speech.

We have listened to a large number of speakers, both in the plenary meetings and in the working commissions. I seem to recall that during the first meeting alone, for the discussion of item 7, no less that 45 speakers took the floor in the name of their respective countries or international organizations. It is therefore perfectly natural - and I would go so far as to say that it is and was desirable - that we should hear different points of view. The problems of the developed countries are quite distinct from those of the developing countries, even though in this brand-new field of informatics, as has been aptly said during the Conference and as the Director-General of Unesco has also recognized, in view of its headlong growth all of us may regard ourselves to some extent as developing countries.

By this very fact, we are bound to concede that the work of the Conference has not satisfied everyone to the same extent. Some countries possibly laid great store by this Conference, and not all may have felt that the debates achieved the desired level or that the conclusions fulfilled the objectives set for SPIN-78. This is also rather to be expected in a meeting such as the Conference we are now closing, with its complexity and its large number of participants.

Nevertheless, I do not think I am exaggerating unduly or indulging in rhetoric if I describe the overall result of the Conference as highly successful. The recommendations and resolutions we have adopted deal with the most vital questions in the sphere of informatics. They outline strategies and policies that may perhaps enable countries to re-examine some of their analyses for developing their endogenous capacities and to orient their foreign procurement policies; they establish certain basic prerequisites for the efficient utilization of informatics, among which I would emphasize that of personnel training in its twin aspects of preparing specialist staff at every level and the promotion of what might be termed general informatics culture; they give very special attention to the various fields of application and establish a series of criteria concerning priorities that will surely be of great value to many countries that have to incorporate informatics procedures into their everyday management operations against the background of limited economic resources and acute basic needs. Finally, they set out a number of suggestions concerning co-operation not only at the bilateral and regional levels but extending to the international sphere.

All in all, I believe that the prediction I made at the outset - that people would speak of the pre-SPIN and post-SPIN eras - is still valid, combined, perhaps, with the belief that our meeting may be the first of a series of similar contacts that will mark the main milestones in the development of informatics.

I should be seriously lacking in courtesy, cordiality and elementary justice if I did not offer the most heartfelt thanks and congratulations to the Directors-General of Unesco and IBI, both as individuals for the care they have taken in the organization of this Conference and as personifying their respective institutions, whose staff have spared no effort or trouble to ensure that the not

inconsiderable difficulties entailed in the undertaking of an enterprise such as this were surmounted, as I believe, to everyone's general satisfaction.

I should also like to express my gratitude to the members of the Steering Committee of the Conference, whose advice has been indispensable in facilitating the conduct of the debates and enabling the meetings to proceed so smoothly, with a special word of thanks to those of its members who took on the responsibility of presiding over the working commissions and guided the discussions with such a sure touch; likewise to the Secretary-General and to the Rapporteur-General, whose work I consider to have been highly valuable.

I have at this point to offer my excuses for the unavoidable occasions - which I endeavoured to keep to the minimum - when I was unable to preside, and I must at the same time thank the members of the Steering Committee who, in their capacity of Vice-President, were good enough to take over my duties in the interim and thus give me invaluable help.

In conclusion, I should like to offer my thanks to each and every one of the delegates and representatives who spoke or, indeed, attended the Conference, for the very sympathetic support they gave me in my work as President and for the many courtesies shown to me personally during the meetings. My thanks also go to the interpreters for their conscientious and efficient work and to all the Conference staff, hostesses, Congress Centre's personnel, etc.

On behalf of the Spanish Government and people, I must tell you how touched I am by your gratitude for our hospitality, by what the Argentine delegate has just said - which you so kindly endorsed by your applause and by the submission and approval of Recommendation No. 25, of which we are highly and properly appreciative. I want to say how glad I am to think that we in Spain have helped, in so far as we have been able, to make the arduous and anxious period of the Conference a rewarding time given over to creative effort in a friendly, welcoming and fraternal atmosphere.

I should like to assure you that it will give me immense pleasure to convey to His Majesty the King and to Her Majesty the Queen the warm message expressed by this Conference. Since the Directors-General of Unesco and IBI also paid us the courtesy of ending their speeches with quotations from Spanish authors, it is clear that I can do no less, and I shall draw your attention to some lines by Antonio Machado that stressing as they do the fact that one finds one's own way forward, constitute a programme for informatics, especially for the developing countries:

"Caminante no hay camino sino estrellas en el mar,
Caminante no hay camino se hace camino al andar".

I need say no more. I declare the SPIN-78 Conference on Strategies and Policies for Informatics closed.

ANNEX IV

LIST OF DOCUMENTS

Title of the document	Reference number of the document
A. WORKING DOCUMENTS	
Provisional Agenda	Unesco/SC-78/SPIN/1 IBI/SPIN/GR/151
Provisional Annotated Agenda	Unesco/SC-78/SPIN/1/Add. IBI/SPIN/GR/151/Add.
Provisional Rules of Procedure	Unesco/SC-78/SPIN/2 IBI/SPIN/GR/152
Strategies and Policies for Informatics (Main Working Document)	Unesco/SC-78/SPIN/3 IBI/SPIN/GR/153
B. REFERENCE DOCUMENTS	
Informatics Development in Selected Countries (Studies prepared for Unesco)	Unesco/SC-78/SPIN/REF.1
Report of the Unesco Regional Seminar on Informatics in South and Central Asia Electronics Commission, Government of India, New Delhi, 1977	
Considerations on Policies for Informatics (Education, Procurement, Telecommunications/ Informatics Interrelations, Industry, Society, Public Sector)	IBI SPIN 201/2/3/4/5/6
Report on the Preparation of the Intergovernmental Conference on Strategies and Policies for Informatics (SPIN)	IBI SPIN 207
Survey on Strategy and Policies for Informatics Throughout the World	IBI SPIN 210
Collection of the Main Resolutions Taken on Informatics by International Bodies	IBI SPIN 211
C. INFORMATION DOCUMENTS	
General Information	Unesco/SC-78/SPIN/INF.1 IBI/SPIN/GR/INF.1
Provisional Timetable of the Meeting	Unesco/SC-78/SPIN/INF.2 IBI/SPIN/GR/INF.2

Annex IV

Title of the document	Reference number of the document
Provisional List of Participants	Unesco/SC-78/SPIN/INF.3 IBI/SPIN/GR/INF.3
Provisional List of Documents	Unesco/SC-78/SPIN/INF.4 IBI/SPIN/GR/INF.4
D. CONFERENCE ROOM DOCUMENTS	
"Computers and Social Options" Impact of Science and Society Unesco, 1978	Vol. 28, No. 3
Study of the Potential Use of Informatics Technology on Problems of Scientific and Technological Co-operation (Unesco contract report)	IIASA
The Computers Role in Undergraduate Chemistry Curricula Unesco, 1976	SC-76/WS/42
Guidelines for the Organization of Training Courses, Workshops and Seminars in Scientific and Technical Information and Documentation Unesco, 1975	SC-75/WS/29
Guidelines for the Evaluation of Training Courses, Workshops and Seminars in Scientific and Technical Information and Documentation Unesco, 1975	SC-75/WS/44
Guidelines on the Conduct of a National Inventory of Scientific and Technological Information and Documentation Facilities Unesco, 1975	SC-75/WS/28
Guidelines on the Planning of National Scientific and Technological Information Systems Unesco, 1975	SC-75/WS/39
SPINES Pilot Programme for the International Exchange of Information on the Application of Science and Technology for Development Unesco, 1977	SC-77/WS/36
Informatics: Its Political Meaning	IBI DGI-04
Informatics in the Service of the New International Economic Order	IBI DGI-05
Description of IBI	
Description of AIDS Project	
IBI Newsletter	
The International Patent Classification as a Means to Identify Basic Technical Information on Computer Hardware and its Applications	SPIN WIPO/1
WIPO's Activities in the Field of Protection of Computer Software	SPIN WIPO/2

ANNEXE V/ANNEX/ANEXO/ПРИЛОЖЕНИЕ / ملحق

LISTE DES PARTICIPANTS/LIST OF PARTICIPANTS/LISTA DE PARTICIPANTES/
СПИСОК УЧАСТНИКОВ/ قائمة المشتركين

Les noms et titres qui figurent dans la liste ci-après sont reproduits dans la forme où ils ont été communiqués au Secrétariat par les intéressés. Les pays sont mentionnés dans l'ordre alphabétique français.

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أدرجت الأسماء والألقاب في هذه القائمة كما قدمتها
للسكرتارية الوفود المعنية، ورتبت أسماء البـــــلاد
بحسب الترتيب الهجائي الانجليزي

I. ETATS MEMBRES/MEMBER STATES/ESTADOS MIEMBROS/
ГОСУДАРСТВА-ЧЛЕНЫ/ الدول الاعضاء

Algérie/Algeria/Argelia/Алжир/الجزائر

Chef de délégation/Head of delegation

M. Kemal Abdallah-Khodja
Secrétaire d'Etat au Plan

Délégués/Delegates

M. Brahim Aissa
Sous-directeur de la coopération multilatérale

M. Djamil Benbouzid
Directeur de la recherche scientifique

M. Djamal-Eddine Benzine
Sous-Directeur de l'informatique
Secrétariat d'Etat au Plan

M. Mustapha Bouarfa
Commissaire national à l'informatique

M. Lounis Bouras
Directeur du Centre d'études et de recherches en informatique

Mme Sahra Bouzaher
Directrice du Commissariat national en informatique

M. Mohamed Ben Bachir El Mir
Conseiller CNI

M. Salah Fellah
Conseiller
Ambassadeur d'Algérie, Madrid

M. M. Hamid
Ambassadeur d'Algérie

M. Ghazi Hidouci
Directeur de la planification
Secrétariat d'Etat au Plan

M. Omar Kezzal
Chargé de mission

M. Youcef Mentalecheta
Directeur de la recherche scientifique et technique CNI

M. Mohamed Tahar Tabti
Directeur du Ministère de l'industrie lourde

M. Aziouz Tidadini
Conseiller
Secrétariat d'Etat au Plan

M. Tewfik Ghersi
Directeur de la planification CNI

République fédérale d'Allemagne
Federal Republic of Germany
República Federal de Alemania
Федеративная Республика Германия
جمهورية المانيا الاتحادية

Chef de délégation/Head of delegation

Dr. Guenter Marx
Ministerial Counsellor
Federal Ministry for Research and Technology

Délégués/Delegates

M. Christoph Rudolhp
Head International Bureau, GMD

M. Precht
German National Commission to Unesco

M. Gunter Lepperhoff
Expert Philips Data Systems
Division Manager

Arabie saoudite/Saudi Arabia/
Arabia Saudita/Саудовская Аравия/
المملكة العربية السعودية

Chef de délégation/Head of delegation

M. Abdul-Razag Algain
Director Social Services Department
Ministry of Planning

Délégués/Delegates

M. Ali Alrashid
General Director of Central Statistics

M. Abdullah Shalhoub
Director of National Computer Centre
Ministry of Finance
Riyadh

Argentine/Argentina/Аргентина/الارجنتين

Chef de délégation/Head of delegation

M. Oscar Gregorio Vélez
Subsecretario de Estado de Informática

Délégués/Delegates

M. Luis Pedro Beccaria
Director de Políticas y Normas de la
Subsecretaría de Informatica

M. Luis María Laurelli
Diplomate

Autriche/Austria/Австрия/النمسا

M. Gerhard Stadler
Membre de l'Office du Premier ministre

Bahrein/Bahrain/Бахрейн/البحرين

Chef de délégation/Head of delegation

M. Mohamed Al-Khalifa
Head of the Computer and the Information Bank
for Government of Bahrain

Délégués/Delegates

M. Ali Aljasim
Head of System Development Section

Bangladesh/Бангладеш/بنجلاديش

Chef de délégation/Head of delegation

H. Exc. M. Shamshul Huda Chaudhury
Minister for Cultural Affairs and Sports

Délégués/Delegates

M. Amir Ali Khan
The Private Secretary to The Honourable Minister
for Culture Affairs and Sports

M. Motahar Hussain
Deputy Secretary Statistics Division
Ministry of Planning, DACCA

Republique populaire du Bénin/
People's Republic of Benin/
República Popular de Benin/
Народная Республика Бенин/
جمهورية بنين الشعبية

Chef de délégation/Head of delegation

M. Marius Francisco
Directeur général de l'Office béninois
d'informatique

Birmanie/Burma/Birmania/Бирма/بورما

Chef de délégation/Head of delegation

U Tin Maung
Director Universities Computer Centre

Bolivie/Bolivia/Боливия/بوليفيا

Chef de délégation/Head of delegation

M. Basilio Plaza Martínez
Gerente general

Délégués/Delegates

M. Raúl Tovar
Director CNC

M. Lucio Clavijo
Gerente de Producción

M. Gastón Paz
Consejero Comercial
Embajada de Bolivia en Madrid

Brésil/Brazil/Brasil/Бразилия/البرازيل

Chef de la délégation/Head of delegation

S. Exc. Geraldo Holanda Cavalcanti
Délégué permanent du Brésil auprès de l'Unesco

Délégués/Delegates

M. Ricardo A. C. Saur
Secretario Ejecutivo de la Comisión de Coordinación de las actividades de procesamiento electrónico
EDP Coordination Committee

M. Ruy Nogueira
Diplomate chargé des affaires de l'informatique au Ministère des affaires étrangères
Division des sciences et technologie

M. Flavio Sehn
Director Presidente
Cia de Processamento de Dados do Estado do Rio Grande do Sul
Praça dos Açorianos
Porto Alegre, R. S.

Bulgarie/Bulgaria/Болгария/بلغاريا

Chef de la délégation/Head of delegation

M. Chavdar Jelezov
Chef de département au Conseil des ministres

Délégués/Delegates

M. Emil Christov
Member of the State Council

M. Rachko Angelinov
Premier vice-président du Comité du système unifié pour l'information sociale auprès du Conseil des ministres

M. Simeon Shanov
Director International Collaboration Committee for Unified System of Social Information at the Council of Ministers

Burundi/Бурунди/بوروندي

Chef de la délégation/Head of delegation

M. Cyprien Baranyitondeye
Directeur de Centre national d'informatique

Délégués/Delegates

M. Edouard Mopozagara
Chef du Service informatique de la Banque centrale

M. Jonathas Niyungeko

Canada/Canadá/Канада/كندا

Chef de la délégation/Head of delegation

M. P. Robinson
Policy Advisor, Computer/Communications
Department of Communications of Canada

Délégués/Delegates

M. Hugues Rousseau
Délégation permanente du Canada auprès de l'Unesco
Troisième secrétaire

Chili/Chile/Чили/شيلي

Chef de la délégation/Head of delegation

M. José Mutis
Coordinador Nacional para la Computación e Informática

M. Enrique Seguel
Director Empresa Nacional de Computación e Informática

Chine/China/Китай/الصين

Chef de la délégation/Head of delegation

M. Pei Lin Yen
Head of the Bureau of Basic Sciences, National Commission of Science and Technology

Délégués/Delegates

M. Hsing-Kang Wang
Research Worker in Computer System Design

Mme Lan-Chieh Huang
Research Worker in Computational Mathematics

Chypre/Cyprus/Chipre/Кипр/قبرص

Chef de la délégation/Head of delegation

M. Harry Menelaov
Director Department of Statistic and Research Department
Ministry of Finance

Délégués/Delegates

M. Leandros Martides
Head of Data Processing
Ministry of Finance, Nicosia

Congo/Конго /الكونغو

Chef de la délégation/Head of delegation

M. Henri Emile Mondjo
Directeur général
Office congolais d'informatique

Côte-d'Ivoire/Ivory Coast/Costa de Marfil
Берег Слоновой Кости/ساحل العاج

Chef de la délégation/Head of delegation

S. Exc. M. Pierre Angoran
Ambassadeur de la Côte d'Ivoire en Espagne

Délégués/Delegates

M. Oumar Toure
Directeur général de l'informatique

M. J. M. Akeboue
Directeur général adjoint de l'OCM

M. André Behary
Conseiller technique à l'OCM

M. Isidore Kore
Directeur téléinformatique et réseaux spécialisés des P et T

M. About Jérôme Tanoh
Diplomate

Cuba/Куба/كوبا

Chef de la délégation/Head of delegation

M. Rodrigo A. Fernández Monert
Presidente del Instituto Nacional de Sistemas Automatizados y Técnicas de Computación

Délégués/Delegates

M. Jorge Sorolla Ortega
Director de Relaciones Internacionales INSAC

M. Jorge Fernández Cabrera
Asesor Consejo de Ministros

M. Seven Fragoso
Especialista Asesor del Presidente INSAC

Egypte/Egypt/Egipto/Египет/مصر

Chef de la délégation/Head of delegation

M. Asmo

Délégués/Delegates

Mme Tawfik
Head of Egyptian Television

Emirats arabes unis/United Arab Emirates
Emirates Arabes Unidos
Объединенные арабские эмираты
الامارات العربية المتحدة

Chef de la délégation/Head of delegation

M. Abdulwahab Al-Radhwan
Director of Mass Communication Documentation Centre

M. Said Khifan Mohammed Brashaud
Director of Fujianha Information
Ministry of Information and Culture

Empire centrafricain/Central African Empire/
Imperio Centroafricano/Центральноафриканская Империя/امبراطورية وسط افريقيا

Chef de la délégation/Head of delegation

M. Alphonse Wago-Lala
Inspecteur du Trésor
Chef de service de liaison avec l'Office national d'informatique

Equateur/Ecuador/Эквадор/اكوادور

Chef de la délégation/Head of delegation

M. Aníbal Soto Casares
Asesor Presidencia de la República

M. Oswaldo Ramírez
Ministro de la Embajada en España

Espagne/Spain/España/Испания/اسبانيا

Chef de la délégation/Head of delegation

Excmo. Sr. D. José Manuel Otero Novas
Ministro de la Presidencia del Gobierno

Délégués/Delegates

M. Manuel María de Uriarte Zulueta
Subsecretario del Ministerio de Industria y Energía

M. Serafín Ríos Mingarro
Secretario General Técnico de la Presidencia del Gobierno

M. Jésus Moneo Montoya
Director General del Instituto Nacional de Prospectiva

M. Juan Antonio Pérez Urruti Maura
Secretario General Técnico del Ministerio de Asuntos Exteriores

M. Luis Pinilla Soliveres
Coronel Secretario General Técnico del Ministerio de Defensa

M. Juan José Scala Estalella
Subdirector General Jefe del Servicio Central de Informática

M. Carlos Benavides Salas
Subdirector General de Informática
Ministerio de Asuntos Exteriores

M. Fernando Rodríguez Garrido
Subdirector General de Organización y Automación del Ministerio de Educación y Ciencia

M. Manuel Herredero Higueras
Secretario General del Servicio Central de Informática

M. José María Rodríguez Cordón
Director de Documentación, Organización e Informática del Ministerio de Asuntos Exteriores

M. Rafael Portaencasa Baeza
Decano de la Facultad de Informática de Madrid

Etats-Unis d'Amérique/United States of America
Estados Unidos de América
Соединенные Штаты Америки
الولايات المتحدة الامريكية

Chef de la délégation/Head of delegation

M. John E. Fobes
Visiting Scholar
Duke University

Délégués/Delegates

M. Irwin M. Pikus
Deputy-Director
Technology Policy and Space Affairs

M. Terrance Lindemann
Acting Foreign Affairs Officer
National Technical Information Service
Department of Commerce

M. Gerald Schmitz
Manager of State Information Systems

Finlande/Finland/Finlandia/Финляндия/فنلندا

Chef de la délégation/Head of delegation

M. Seppo Salminen
Director, Ministry of Finance

Délégués/Delegates

Ilmari Pietarinen
Chief Inspector at the Ministry of Finance

M. Pertti Jarvinen
Professor at the University of Tampere

France/Francia/Франция/فرنسا

Chef de la délégation/Head of delegation

M. Jean-Claude Pelissolo
Directeur des industries électroniques et de l'informatique (DIELI)
Ministère de l'industrie

Délégués/Delegates

M. André Danzin
Directeur de l'Institut de recherche d'informatique et d'automatique (IRIA)
Ministère de l'industrie

M. Raymond Micoulaut
Conseiller technique
Ministère des affaires étrangères

M. Jean Mazeo
Conseiller au Ministère des affaires étrangères

M. Claude Tapiero
Attaché scientifique
Ambassade de France à Madrid

M. Robert Germinet
Adjoint au Directeur des industries électroniques de l'information
Ministère de l'industrie

M. Philippe Lemoine
Conseiller auprès du Chef de la Mission à l'informatique
Ministère de l'industrie

M. Jean-Pierre Ayrault
Chef du Groupe de conseil pour la coopération internationale en informatique et automatique

M. Hervé Mouren
Chargé de mission
Ministère de l'industrie

M. Maurice Robin
Chargé des affaires internationales de l'IRIA
Ministère de l'industrie

M. Jean-Paul Costa
Maître des requêtes au Conseil d'Etat

M. Gilles Chatin
Chargé de mission
Ministère de la coopération

M. Michel Delamarre
Chargé de mission
Ministère de l'industrie

M. Guy Mainguenaud
Adjoint au Chef du groupement réseaux, terminaux et services
Centre national d'études des télécommunications

Gabon/Gabón/Габон/جابون

Chef de la délégation/Head of delegation

M. Luis Ingongui
Délégué informatique
Présidence de la République

Haute-Volta/Upper Volta/Alto Volta/Верхняя Вольта/فولتا العليا

Chef de la délégation/Head of delegation

M. Michel Campaore
Directeur général du Centre national de traitement de l'information

Délégués/Delegates

M. Michel Meda
Conseiller informatique
Ministère des finances

M. Hamadou Lougue
Ministère du Plan

M. Daniel Bamogo
Centre national de traitement de l'information

Honduras/Гондурас/هندوراس

Chef de la délégation/Head of delegation

M. Carlos Deambrosis-Martins
Ambassadeur du Honduras auprès de l'Unesco

Délégués/Delegates

Mme Diane Deambrosis

M. Luis Valcarcel
Asesor Técnico de la Delegación

Hongrie/Hungary/Hungría/Венгрия/المجر

Chef de la délégation/Head of delegation

Dr. Loxant Nemeth
Director, Central Statistical Office
National Bureau of Computer Applications

Délégués/Delegates

M. Sandor Farago
Director, International Computer Education and Information Centre

Mme Zsuzsa Szentgyorgyi
Research Worker
Computer and Automation Institute
Hungarian Academy of Sciences

Indonésie/Indonesia/Индонезия/اندونيسيا

Chef de la délégation/Head of delegation

M. Sondang P. Siagian
Chairman, National Institute of Public Administration

Délégués/Delegates

M. Tubagus Headar Ali
Head of Data Analysis
Deputy Manager of Ministry of Public Works

M. Piay L. Kasenda
Deputy of Data Processing Centre Manager

M. Edi Witoyo
Staff of Vice President

Irak/Iraq/Ирак/العراق

Chef de la délégation/Head of delegation

Dr. Hilal Aboud Albayati
Director General of NCC

Délégués/Delegates

M. Abdul Illah Al-Dewachi
Executive Director
Dept. of Computing and States, Baghdad

M. Izzudeen Essaid

M. Musadk Suliman Younes

Iran/Irán/Иран/ايران

Chef de la délégation/Head of delegation

His Exc. M. Firouz Vakil
Deputy Minister of Plan and Budget Organization for Informatics

Délégués/Delegates

Mme Saiedeh Zakaria
Computer expert of the Institute for Research and Planning in Science and Education

Irlande/Ireland/Irlanda/Ирландия/ايرلندا

Chef de la délégation/Head of delegation

Prof. F. C. Foster
Chairman of Computer Policy Advisory Committee

Délégués/Delegates

M. Richard J. Nolan
Head of Computer Policy Section
Central Data Processing Services
Public Service Computer Centre, Dublin

Israël/Israel/Израиль/اسرائيل

Chef de la délégation/Head of delegation

M. Dov Chevion
Director Office Mechanization Centre Israël

Italie/Italy/Italia/Италия/ايطاليا

Chef de la délégation/Head of delegation

S. Exc. M. Ludovico Carducci Artenisio
Délégué permanent auprès de l'Unesco, Paris

Délégués/Delegates

M. Emidio Valentini
Subjefe de Gabinete Ministro Ricerca Scientifica Tecnologia

M. Italo Rocca
Consejero del Tribunal Supremo
Jefe de la Oficina Legislativa y de las Relaciones Internacionales Investigación Científica

M. Giacomo Di Lorio
Procurador General de Estado

M. Umberto Pellegrini
Presidente de la Federación de Asociaciones Científicas y Técnicas de Milán

M. Gesualdo Le Moli
Professore Director del Centro Red Europea Informativa, Milán

M. Giovanni Cammarano
Consejo Científico del Ministro para la Investigacion Científica

M. Angelo Marzollo
University Professor
Facultad de Ingeniería de la Universidad de Trieste

Jamahiriya arabe libyenne populaire et socialiste/Socialist People's Libyan Arab Jamahiriya/Jamahiriya Arabe Libia Popular y Socialista/Социалистическая Народная Ливийская Арабская Джамахирия/الجماهيرية العربية الليبية الشعبية الاشتراكية

Chef de la délégation/Head of delegation

M. Said Sultan Ftis
Chef de l'administration de recherche et planning à la presse - Tripoli

Jordanie/Jordan/Jordania/Иордания/الاردن

Délégués/Delegates

M. Munthir Salah
Director of Computer Systems Department Royal Scientific Society

Koweit/Kuwait/Kuweit/Кувейт/الكويت

Chef de la délégation/Head of delegation

M. Fadhel A. Albusairi

Délégués/Delegates

M. Ahmed Sa'ad Al Nahed

Liban/Lebanon/Líbano/Ливан/لبنان

Chef de la délégation/Head of delegation

M. Joseph Wehbe
Président de la Commission interministérielle de l'informatique

Malaisie/Malaysia/Malasia/Малайзия/ماليزيا

Chef de la délégation/Head of delegation

M. Mohamed Iwaz Karim
Deputy Director-General
Implementation Coordination Unit
Prime Ministers Department

Maroc/Morocco/Marruecos/Марокко/المغرب

Chef de la délégation/Head of delegation

M. Abdelmalek Cherkaoui
Secrétaire général du Secrétariat d'Etat au Plan

Délégués/Delegates

M. Jamal Eddine Abderrazik
Chef de division de l'informatique
Ministère des postes et télécommunications

M. Hassan Kadiri
Chef de division de l'informatique SEPDZ

M. Azzedine Azzati Zouraq
Chef de service d'analyse et programmation

M. Ahmed Moubarik
Chef du service informatique du Ministère de l'éducation nationale

Mexique/Mexico/México/Мексика/المكسيك

Chef de la délégation/Head of delegation

M. Sergio Mota
Coordinador del Sistema Nacional de Información

Délégués/Delegates

M. Alberto Salvador Camarena Carreño
Asesor en Coordinación General de Programación y Presupuesto

M. Carlos Enriquez Arcaraz
Director General de Diseño e Implantación del Sistema Nacional de Información

M. C. P. Carlos Romero Alamán
Subdirector de Política Informática

M. Sergio Ahumada Rivera
Jefe del Programa de Productividad
Subdireccion de Política Informática

M. Gerardo Garcia Noriega
Gerente de Informática en la Nacional Financiera S. A.

M. Enrique Melrose Aguilar
Gerente Tecnico de Boletrónico

M. Enzo Molino
Jefe Departamento de Desarrollo de Sistemas de Información

Nigeria/Нигерия/نيجيريا

Chef de la délégation/Head of delegation

M. G. O. Awomolo
Assistant Director Informatics

Délégués/Delegates

M. S. O. Sowoolu
Director of National Archives

M. Olu Odumosu
National Science and Technology Development Agency - Lagos

M. Simeon Aje
Director, National Library of Nigeria

Norvège/Norway/Noruega/Норвегия/النرويج

Chef de la délégation/Head of delegation

M. Birger Norum
Director of Administration
City of Trondheim

Ouganda/Uganda/Уганда/أوغندا

Délégués/Delegates

M. E. S. Francis Katana
Management Trainer
Uganda Institute of Public Administration

Panama/Panamá/Панама/بنما

Délégués/Delegates

M. Damián Castillo Durán
Contralor de la República

M. Jorge Karica
Analista de Sistemas de Programación

M. Leopoldo Mosica Castro
Director de Sistematización de Datos

M. Azael Purcait Ibarra
Registro - Control de Presupuesto

Paraguay/Парагвай/باراجواى

Délégués/Delegates

M. Néstor Manuel Britez Airaldi
Consultant

Pays-Bas/Netherlands/Países Bajos/Нидерланды/الاراضى الواطئة

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H. Exc. H. H. Koning
State Secretary
Ministry of Home Affairs

Délégués/Delegates

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Principal Director for Fin-Econ/PTT

M. J. M. Van Oorschot
Director of Procurement Agency VWC/PTT

M. J. G. F. Veldhuis
Deputy Secretary-General
Ministry of Education and Science

M. F. D. Kordes
Director for Organization and Automation
Ministry of Home Affairs

M. B. K. Brussaard
Director for Automatic Information Systems
Ministry of Interior

M. W. C. Nieuwport
Deputy Director of the Committee for Calculation and Information (CRIVIA)

M. P. D. D. Van Waardhuizen
Director for Organisation and Automation
Ministry of Education and Science

Philippines/Filipinas/Филиппины/الفلبين

Délégués/Delegates

M. Robert O. Felipe
Director, Policy Planning and Standards National Computer Centre

M. Amante Villabroza
Deputy Managing Director
National Computer Centre

Pologne/Poland/Polonia/Польша/بولندا

Chef de la délégation/Head of delegation

M. J. L. Kulikowski
Directeur du secrétariat du Comité de l'informatique
Conseil des ministres de Pologne

Délégués/Delegates

M. Augustyn Z. Jaholkowski
Spécialiste au secrétariat du Comité de l'informatique
Conseil des ministres de Pologne

Portugal/Португалия/البرتغال

Chef de la délégation/Head of delegation

M. Antonio Jorge Figueiredo Lopes
Director General Administrative Organization

Délégués/Delegates

M. J. Castro Correia
Head of Informatics
Organizaçao Administrativa

M. J. Alves Lavado
Técnico Principal de la Dirección General
Organizaçao Administrativa

M. J. M. Guerreiro Matoso
Jefe Servicio Informática de Departamento Central de Planificación

République arabe syrienne/Syrian Arab Republic/República Arabe Siria/Сирийская Арабская Республика/الجمهورية العربية السورية

Chef de la délégation/Head of delegation

M. A. Wassek Chahid
Directeur général du Centre d'études et recherches scientifiques

Délégués/Delegates

M. Abdallah Mufti
Directeur du Service d'informatique

M. Adel Mardini
Représentant du Centre statistique
Directeur adjoint du Centre

République démocratique allemande/German Democratic Republic/República Democrática Alemana/Германская Демократическая Республика/جمهورية المانيا الديمقراطية

Chef de la délégation/Head of delegation

M. Günter Zillmann
Vice-ministre de la science et de la technique

Délégués/Delegates

M. Hans Och
Directeur de l'Institut central de l'information et de la documentation

M. Horst Kretzschmar
Director of Institute
Berlin (RDA)

M. Ernst Kretzschmar
Expert in the Ministry of Sciences and Technology
Berlin (RDA)

Mme Brigitte Spangenberg
Collaboratrice au Ministère de la science et de la technique
Interprète

République socialiste soviétique de Biélorussie
Byelorussian Soviet Socialist Republic
República Socialista Soviética de Bielorrusia
Белорусская Советская
Социалистическая Республика
جمهورية بيلوروسيا الاشتراكية السوفييتية

Chef de la délégation/Head of delegation

M. Gennadi Artiouchevski
Chef de la Division de la science et de la technique du conseil des ministres de la RSS de Biélorussie

République socialiste soviétique d'Ukraine
Ukrainian Soviet Socialist Republic
República Socialista Soviética de Ucrania
Украинская Советская Социалистическая
Республика جمهورية اوكرانيا الاشتراكية السوفييتية

Chef de la délégation/Head of delegation

M. Oleg Kassian
Chef de la Division de l'information du GOSPLAN

Délégués/Delegates

M. Victor Pzaksov
Directeur adjoint de l'Institut de l'information du GOSPLAN

République Unie du Cameroun
United Republic of Cameroon
República Unida del Camerún
Объединенная Республика Камерун
جمهورية الكمرون المتحدة

Délégués/Delegates

M. Boniface Tchinda
Directeur de l'informatique et de la télématique

M. Etian Eleih-Elle
Chargé d'affaires du Cameroun en Espagne

Roumanie/Romania/Rumania/Румыния رومانيا

Chef de la délégation/Head of delegation

M. Marius Curan
Director, Central Institute for Management and Informatics

Délégués/Delegates

M. Gheorghe Chivu
Secretario de Embajada en España

Royaume-Uni de Grande-Bretagne et d'Irlande du Nord
United Kingdom of Great Britain and Northern Ireland
Reino Unido de Gran Bretaña e Irlanda del Norte
Соединенное Королевство Великобритании
и Северной Ирландии/المملكة المتحدة لبريطانيا العظمى وايرلندا الشمالية

Chef de la délégation/Head of delegation

M. W. R. Atkinson
Director, Central Computer Agency, London

Délégués/Delegates

M. K. G. Bloomfield
Ministry of Overseas Development
United Nations Department

M. R. M. D. Ure
Department of Industry

M. Alan Benjamin
Director General, Computing Services Association

M. E. J. Howe
Deputy Director National Computing Centre Ltd
Manchester

M. P. D. Hall
Director International Computers Ltd, London

M. P. A. Samet
Professor of Computer Science
President, British Computer Society

Sénégal/Senegal/Сенегал/السنغال

Chef de la délégation/Head of delegation

M. Mamadou Lamine Dieye
Directeur de l'informatique
Dakar

Délégués/Delegates

M. Magatte Diouf
Conseiller au Bom, Dakar

Somalie/Somalia/Сомали/الصومال

Chef de la délégation/Head of delegation

M. Abdallahi Yahie
E. D. P. Manager
State Planning Commission

Soudan/Sudan/Sudán/Судан/السودان

Chef de la délégation/Head of delegation

M. Ibrahim Saad El-Miligi
Lecturer and Member of the National Commission for Computers
University of Khartoum

Suède/Sweden/Suecia/Швеция/السويد

Chef de la délégation/Head of delegation

Mrs. Kerstin Aner
Secretary of State

Délégués/Delegates

M. Per Svenonius
Head of Department

M. Johan Martin-Lof
Senior Technical Adviser
Ministry of Industry

M. Tomad Ohlin
National Swedish Board for Technical Development

M. Lennart Bage
Head of Section
Division for International Development Cooperation
Ministry for Foreign Affairs

Swaziland/Swazilandia/Свазиленд/سوازيلاند

Délégués/Delegates

M. Daniel M. Dlamini
Data Processing Manager

Tchécoslovaquie/Czechoslovakia/Checoslovaquia/Чехословакия/تشيكوسلوفاكيا

Chef de la délégation/Head of delegation

Mme Hana Vitkóva
Chef de la Division du Ministère fédéral pour le développement
Ministère fédéral pour le développement technique et les investissements

Délégués/Delegates

M. Zdenek Opocensky
Chef de division
Ministère tchèque de l'investissement et technique

Thailande/Thailand/Tailandia/Таиланд/تايلاند

Chef de la délégation/Head of delegation

M. Kajit Buajitti
Director General Meteorological Department
Ministry of Communications

Délégués/Delegates

M. Thavisakdi Thangsuphanieh
Director Data Processing Center of Thailand
Centre of Thailand

Mme Nualnart Thamrong Navasavat
Asst. Director
Data Processing Centre of Thailand

Togo/Toro/توجو

Chef de la délégation/Head of delegation

M. Kouassi Freitas
Directeur par intérim de la statistique et de l'informatique

Tunisie/Tunisia/Túnez/Тунис/تونس

Chef de la délégation/Head of delegation

M. Slaheddine Karoui
Président directeur général du Centre national de l'informatique

Délégués/Delegates

M. Mouldi Miled
Président directeur général de la Société tunisienne de traitement de l'information

M. Noureddine M'Rabet
Chef de service de la fonction publique
Fonctionnaire au service du Premier ministre

M. Abdelwahab Ben Hamadi
Directeur de l'organisation et de l'information
Ministère des finances

M. Naceur Gnichi
Directeur d'administration
Ministère de l'éducation national

M. Mohamed Ketari
Sous-directeur des études et programmes
Ministère des transports et communications

M. Abdeljalil Jehane
Directeur à la Banque centrale de Tunisie

M. Mohsen Boudagga
Directeur des études, de la planification et des agréments au Centre national de l'informatique

Turquie/Turkey/Turquía/Турция/تركيا

Chef de la délégation/Head of delegation

M. Aydin Köksal
Directeur, Information Processing Centre USYM

Union des républiques socialistes soviétiques
Union of Soviet Socialist Republics
Unión de Repúblicas Socialistas Soviéticas
Союз Советских Социалистических Республик
اتحاد الجمهوريات الاشتراكية السوفييتية

Chef de la délégation/Head of delegation

M. Genni Kavalerov
Vice-ministre de l'automatisation d'instruments et de moyens d'automatisation et de télécommunications de l'URSS

Délégués/Delegates

M. Youri Klytekov
Directeur de la sous-direction du Comité d'Etat de planification (GOSPLAN) de l'URSS

M. Constantin Roubanik
Conseiller
Secrétariat de la Commission de l'URSS pour l'Unesco
Ministère des affaires étrangères de l'URSS

M. Youri Alexandrovich Micheev
Directeur adjoint de l'Institut de recherche en matière d'organisation et de gestion

Uruguay/Уругвай/اوروغواي

Chef de la délégation/Head of delegation

M. Adolfo Castells Mendivil
Ministro Consejero de la Embajada del Uruguy en España

Venezuela/Венесуэла/فنزويلا

Chef de la délégation/Head of delegation

M. Luis José Díaz Zuloaga
Director General de Planificación y Presupuesto
Ministerio del Ambiente

Délégués/Delegates

M. Carlos González Delgado
Gerente Técnico Empresa Venezolana de Informática

Yougoslavie/Yugoslavia/Югославия/يوغسلافيا

Chef de la délégation/Head of delegation

Dr. Ivan Mecanovic
President of the Council for Informatics
Zagreb

Délégués/Delegates

Dr. Rodosav Boskovic
Director of INDOC Centre
Belgrade

Prof. Han Stjepan
Director of the Institute of Informatics
Novi Sad

M. Andrei Jerman-Blazic
Deputy Secretary for Information Systems

M. D. Hadži-Popovic
Conseiller au Ministère de l'industrie

M. Nada Milosevic
Adviser in the Republican Institute for Public Administration

République du Zaire/Zaire Republic
República del Zaire/Республика Заир
جمهورية زائير

Chef de la délégation/Head of delegation

M. Nda-Ngye Mpia
Conseiller au Bureau du Président

Délégués/Delegates

M. Matundu Ne-N'Kueno
Chargé de programme, Service présidentiel de l'informatique (SPI)

M. Dondi-Bungu Kiaka
Secrétariat général du Conseil permanent de l'informatique au Zaïre (COPIZ)

M. Tshibambe Kabamba
Chef de division, Banque de données du SPI

M. Olela
Secrétariat du Bureau présidentiel

II. ETATS NON MEMBRES/NON-MEMBER STATES/ESTADOS NO MIEMBROS/ ГОСУДАРСТВА, НЕ ЯВЛЯЮЩИЕСЯ ЧЛЕНАМИ ЮНЕСКО/ الدول غير الاعضاء

Saint-Siège Holy See Santa Sede Ватикан الكرسي البابوي

Rev. Père Jorge Blajot S. J.

Dr. Sébastien Valentin

III. ORGANISATIONS DU SYSTEME DES NATIONS UNIES/ ORGANIZATIONS OF THE UNITED NATIONS SYSTEM/ ORGANIZACIONES DEL SISTEMA DE LAS NACIONES UNIDAS/

Programme des Nations Unies pour l'environnement (PNUE/United Nations Environment Programme (UNEP)

M. Tomislav Munetic
Programme Officer
International Referral System (IRS)

Organisation des Nations Unies pour le développement industriel (ONUDI)/United Nations Industrial Development Organization (UNIDO)

M. Vladimir Podshibyakin
Industrial Information Office

M. N. Suzuki
Factory Establishment and Management

Institut des Nations Unies pour la formation et la recherche/United Nations Institute for Training and Research (UNITAR)

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Management Development Branch

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Organisation mondiale de la propriété intellectuelle (OMPI)/World Intellectual Property Organization (WIPO)

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Patent Information Division

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Libreville, République gabonaise

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